



Service manual



OEM TREADMILL ERGOMETERS

Intended Use

A Lode treadmill is a diagnostic tool intended to be used as a stress test device in a medical environment. The main goal of the use of a Lode treadmill is to create reproducible stress tests. The following parameters can be measured:

- Speed (km/h or Miles/h)
- Time (minutes and seconds)
- Distance (km Miles Meters)
- Optional: Heart rate (beats per minute)
- Grade (%)

In combination with other diagnostic tools, like ECG or pulmonary function equipment, other important physiological data can be obtained, allowing a physician to evaluate a test subject's physical status.

A Lode treadmill is designed both for manual operation and control by external ECG-, pulmonary equipment. In combination with optional software, the ergometer can also be controlled by a PC.

The Lode treadmill has to be operated under the supervision of well-trained medical specialists, like cardiologists, pulmonologists and physiotherapists. The ultimate judgment whether a test subject should undertake a stress test with an ergometer and which protocols should be used must be made by the responsible medical specialist, based on the limitations of each individual, the medical history and all other applicable circumstances. Neither Lode BV nor her distributors take any responsibility for the final use of its equipment.

Contra Indication

The Lode treadmills are to be operated by classified personnel only. As stated in the intended use, the Lode treadmills are intended to be used in a medical environment. During the intended use the test subject will deliver energy. Application of the wrong dosis of energy could lead to permanent damage of the test subject's health.

Maintenance

The Lode treadmills should be calibrated once a year. In case any damage is observed of the Lode treadmill. Lode B.V. or her representative should be informed in order to execute the necessary repair(s). Service of the Lode treadmills is restricted to factory-trained personnel only.

Precautions

Caution: This device should only be sold by, or on the order of authorized persons.

Caution: Not suitable for use in the presence of flammable anaesthetics.

Possible hazards

Using the Lode treadmills according to intended use, contra indications, maintenance, precaution and common sense stated above may not eliminate all hazards. Possible residual hazards could be: wrong installation, wrong use, wrong dose, wrong interpretation of readings, mechanical breakdown of parts, software failure.

List of Symbols used



On/Off switch



External Input



External Output



Type B Electrical Safety



Separate collection of electric and electronic equipment

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Warnings

Observe the following precautions when servicing the treadmill:

- Do not start the walking belt when someone is on the treadmill. The belt could start moving immediately, and sudden start and subsequent loss of balance could cause serious personal injury.
- High voltage is present when the treadmill hood is removed and the treadmill is plugged in.
- Do not wear loose clothing around the rotating machinery.
- Never place your fingers near rotating parts.



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1 Technical specifications

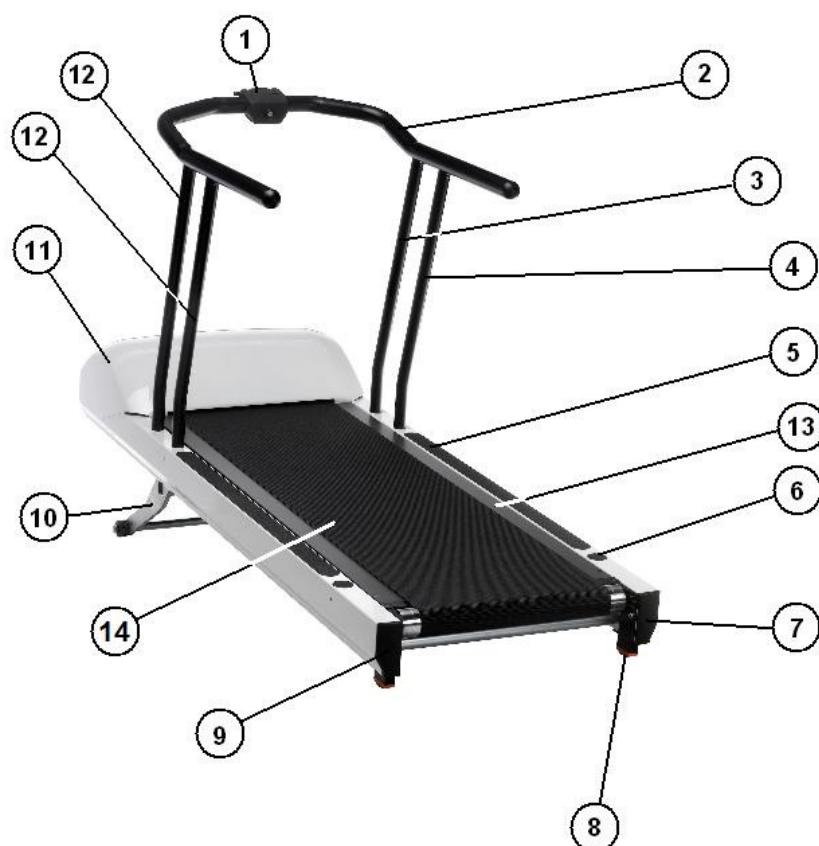
1.1 Technical specifications OEM treadmill 939900

LODE TREADMILL	OEM Treadmill 939900
SPEED RANGE - <i>km/h</i> - <i>mph</i>	0,5 – 20 km/h (steps 0,1 km/h) 0.3 – 12 mph
HEIGHT ADJUSTMENT FRONT SIDE	0 – 25%
WALKING SURFACE	50 x 150 cm
MAXIMUM PATIENT WEIGHT	160 kg
POWER REQUIREMENTS - Motor	230 VAC, 50-60 Hz 115 VAC, 50-60 Hz. (Between two Phases) 1,8 kW
DIMENSIONS (L x B x H), cm	212 x 76 x 110 cm
WEIGHT	145 kg
ENVIRONMENTAL CONDITIONS Operational: - <i>temperature °C (°F)</i> - <i>humidity (non condensing) %</i> - <i>air pressure kPa</i> Storage: - <i>temperature °C (°F)</i> - <i>humidity (non condensing) %</i> - <i>air pressure kPa</i>	14 – 40 °C (57 – 104 °F) 30 - 90 70 - 106 -25 - 70°C (13 – 167 °F) 10 - 95 50 - 106
STANDARD & SAFETY NORMS	ISO 9001:2000, ISO 13485:2003, IEC 601-1 FDA 510K
SAFETY / EMERGENCY STOP - magnetic lanyard - stop button	standard optional
INTERFACE	RS232, USB Bluetooth ® and Wifi optional
HEARTRATE	optional
REAR ELEVATION - mechanically: -10% – 0% - electrically: -10% - 0%	optional optional

LODE TREADMILL	OEM Treadmill 939900
ENTRANCE PLATE	optional
ANTI SLIP STRIPS	standard
SIDE HANDRAILS FIXED (HEIGHT 850 MM)	optional
SIDE HANDRAILS ADJUSTABLE - height: 791 – 954 mm - width : 440 – 975 mm	optional
PEDIATRIC FRONT HANDRAIL	optional
PEDIATRIC SIDE HANDRAIL - height: 600 - 763 mm - width : 440 – 975 mm	optional
ARM SUPPORT	optional
WIDER / LONGER RUNNING SURFACE	optional
SAFETY BELT AND FALLSTOP	optional
MOBILE FALLSTOP	optional
BODY WEIGHT UNLOAD SYSTEM	optional

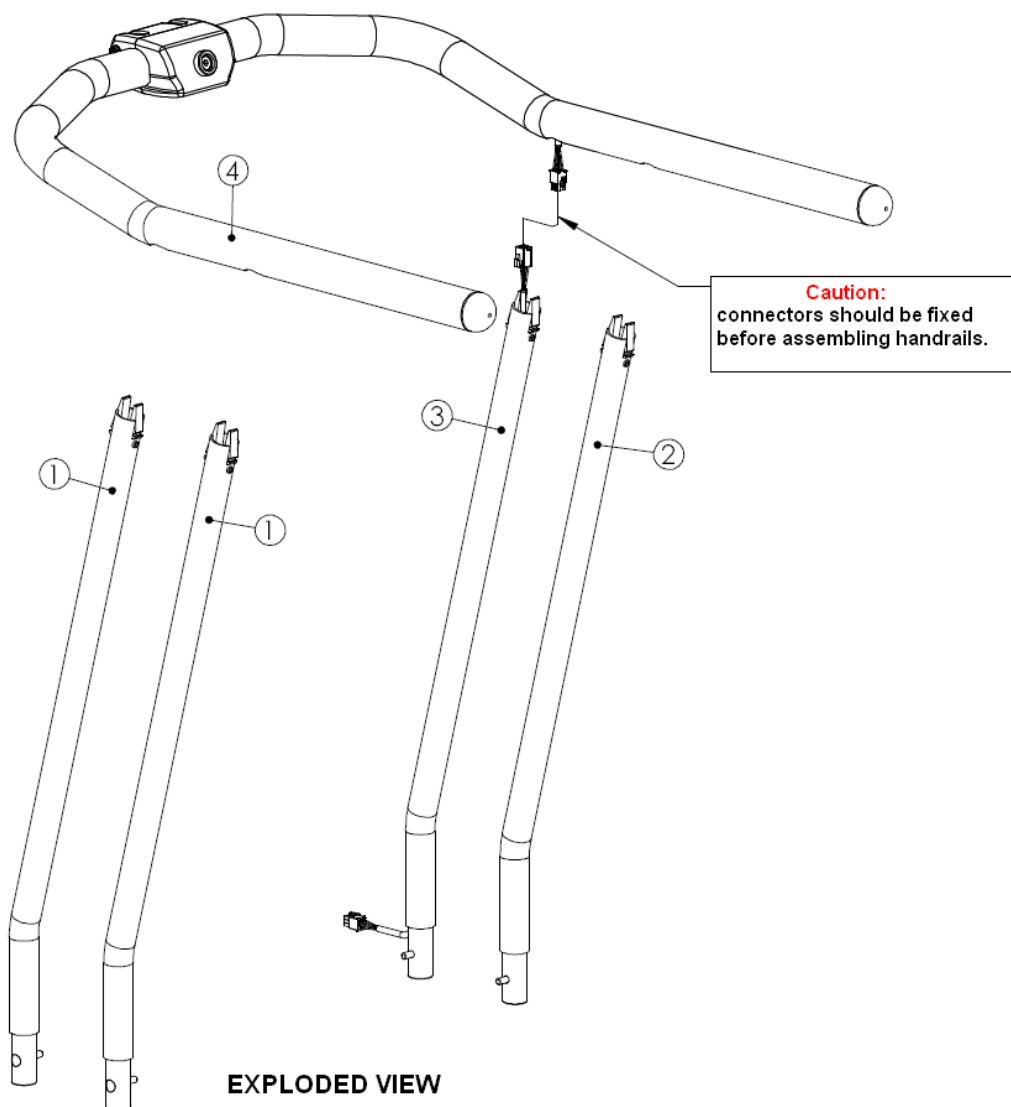
2 Assemblies

2.1 Final assembly OEM treadmill 939900



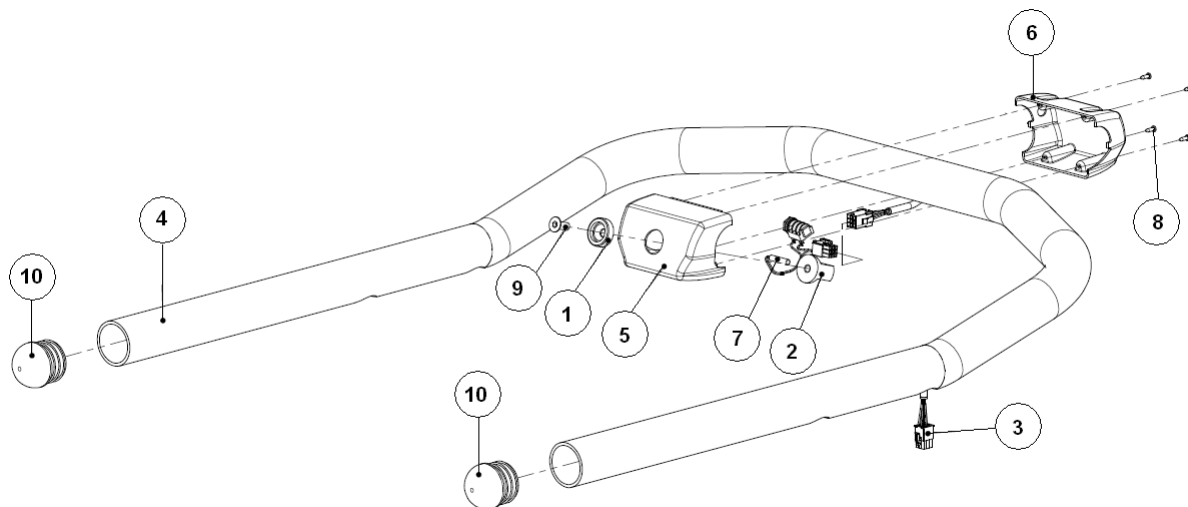
Item no.	Quantity per assy	Part Number	Description
1	1		EMERGENCY STOP ASSY
2	1	939110	FRONT HANDRAIL TOP ASSY
3	1	939017	VERTICAL ARM HANDRAIL WITH CABLE, RIGHT
4	1	939016	VERTICAL ARM HANDRAIL, RIGHT
5	2	939038	ANTISLIP STRIP 100 CM
6	2	939176	COSMETIC COVER HOLE SIDEHANDRAIL
7	1	939919	COSMETIC COVER SIDEBAR RIGHT
8	2	871907	RUBBER FEET
9	4	932167	COSMETIC COVER SIDEBAR LEFT
10	1		GRADE ADJUSTMENT ASSY
11	1	932928	COVER VALIANT
12	1	939015	VERTICAL ARM HANDRAIL, LEFT
13	1	939015	VERTICAL ARM HANDRAIL, LEFT
14	1	932950	BELT, 50 X 150 CM
15	1	939951	DECK, 50 X 150 CM

2.2 Handrail assy 939020

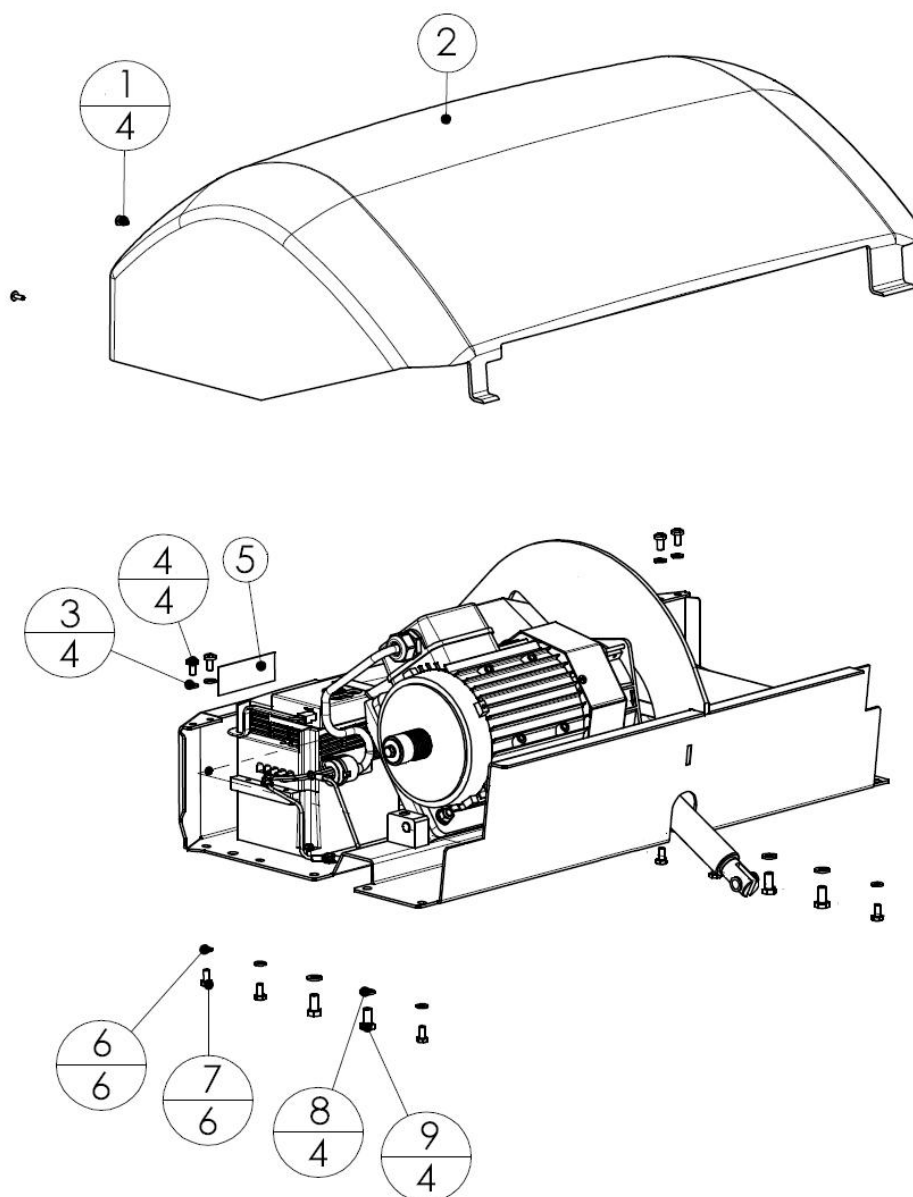


Item Number	Quantity per assy	Partnumber	Description
1	2	939015	VERTICAL ARM HANDRAIL, LEFT
2	1	939016	VERTICAL ARM HANDRAIL, RIGHT
3	1	939017	VERTICAL ARM HANDRAIL WITH CABLE, RIGHT
4	1	939110	UPPER HANDRAIL ASSY

2.3 Upper handrail assy 939110

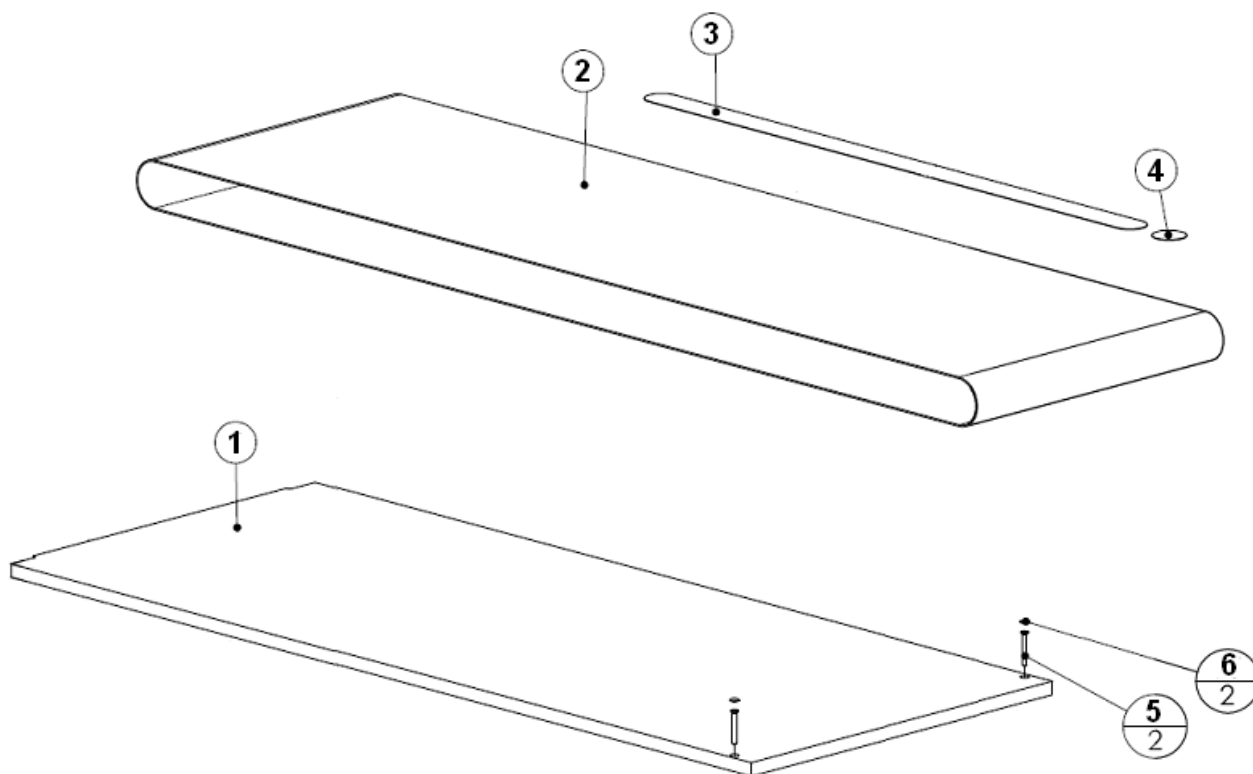


Item no.	Quantity per assy	Part Number	Description
1	1	939032	FRONT RING MAGNET SWITCH
2	1	939033	REED CONTACT BRACKET
3	1	9397122	HANDRAIL, CABLE
4	1	939915	BAR HORINZONTAL HANDRAIL
5	1	939930	EMERGENCY STOP HOUSING FRONT
6	1	939931	EMERGENCY STOP HOUSING BACK
7	1	9457422	CABLE ASSY REED SENSOR
8	4	813808	SCREW 3,5 X 12 MM
9	1	817312	SCREW M8 X 20 MM
10	1	871903	COSMETIC COVER

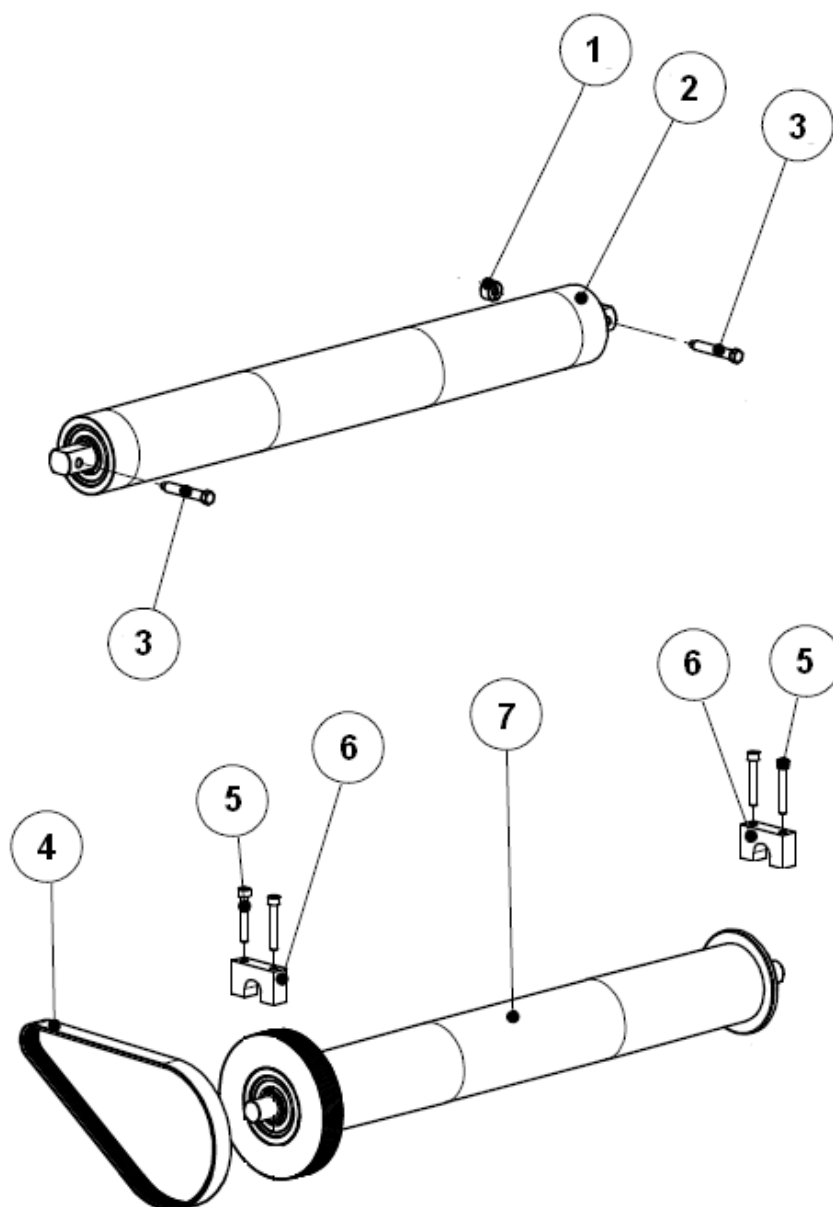


Item no.	Quantity per assy	Part Number	Description
1	4	813006	WASHER M6
2	1	939913	COVER MOTOR COMPARTMENT
3	4	811765	WASHER, SPRING M5
4	4	815408	SCREW M5 X 12 MM
5	1	939050	SERIALNUMBER SIGN
6	6	811765	WASHER, SPRING M5
7	6	816416	SCREW M6 X 40 MM
8	4	811766	WASHER, SPRING M6
9	4	817608	SCREW M8 X 12 MM

2.5 Belt & deck 932950 & 939951

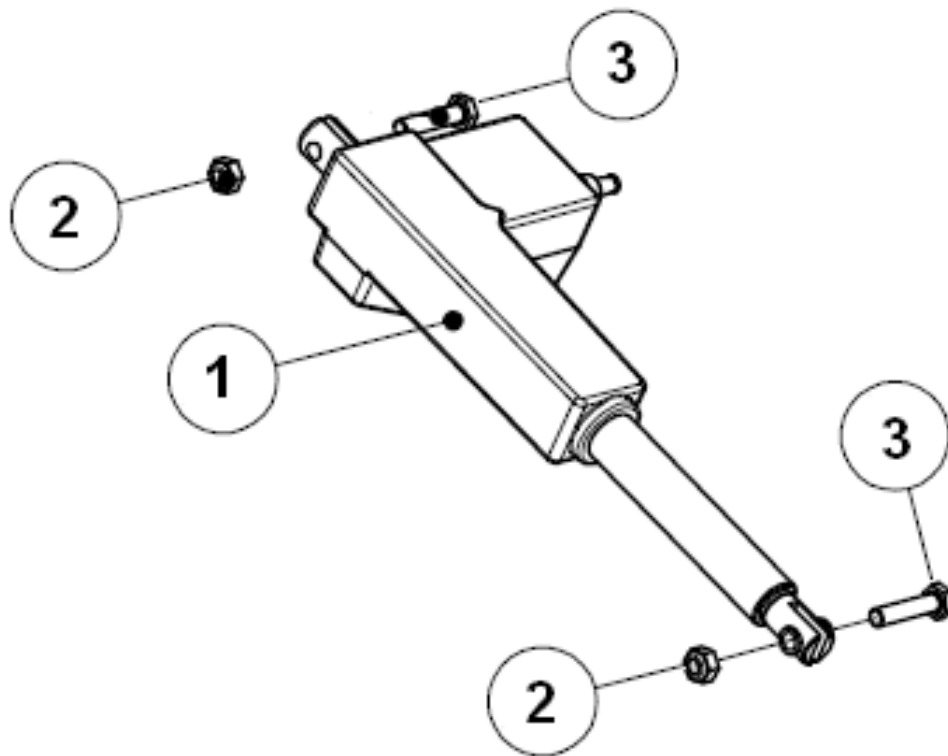


Item no.	Quantity per assy	Part Number	Description
1	1	939951	DECK, 50 X 150 CM
2	1	932950	BELT, 50 X 150 CM
3	2	939038	ANTI SLPI STRIP, 100 CM
4	2	939915	COSMETIC COVER
5	2	816118	SCREW, COUNTERSUNK M6 X35
6	1	871908	POP-IN SCREW COVER

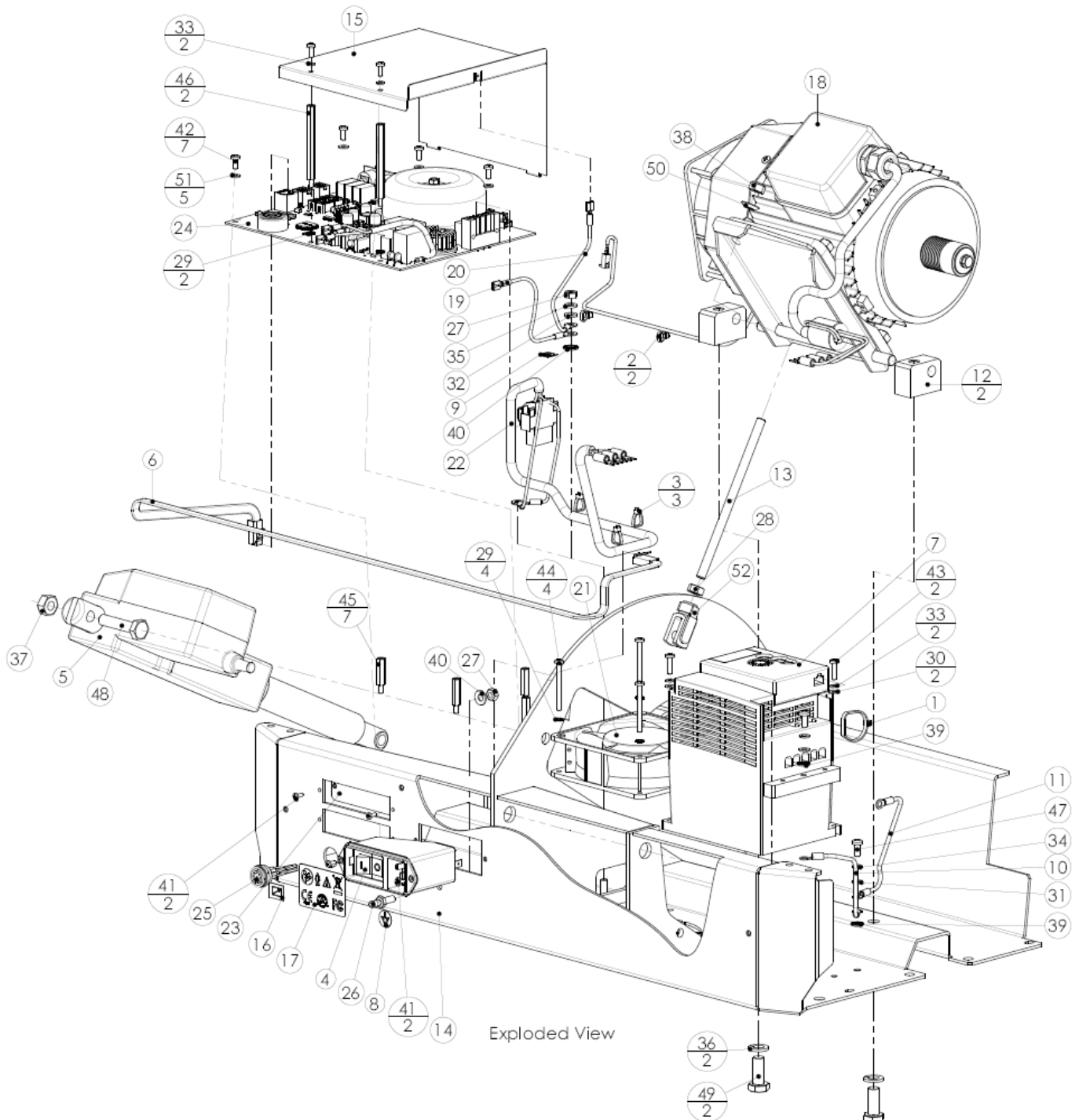


Item no.	Quantity per assy	Part Number	Description
1	2	939018	SPANNER SUPPORT
2	1	939410	REVERSE ROLLER
3	1	827618	SCREW, SOCKET CAP M8 X 50 MM
4	1	932983	BELT, MULTI-V
5	4	816416	SCREW, SOCKET CAP M6 X 40 MM
6	2	932123	CLAMP, AXLE
7	1	9394002	DRIVE ROLLER

2.7 Grade motor 220017



Item no.	Quantity per assy	Part Number	Description
1	1	220017	GRADE MOTOR
2	2	811861	NUT, NYLON INSERT
3	2	818517	SCREW, HEX M10 X 45 MM



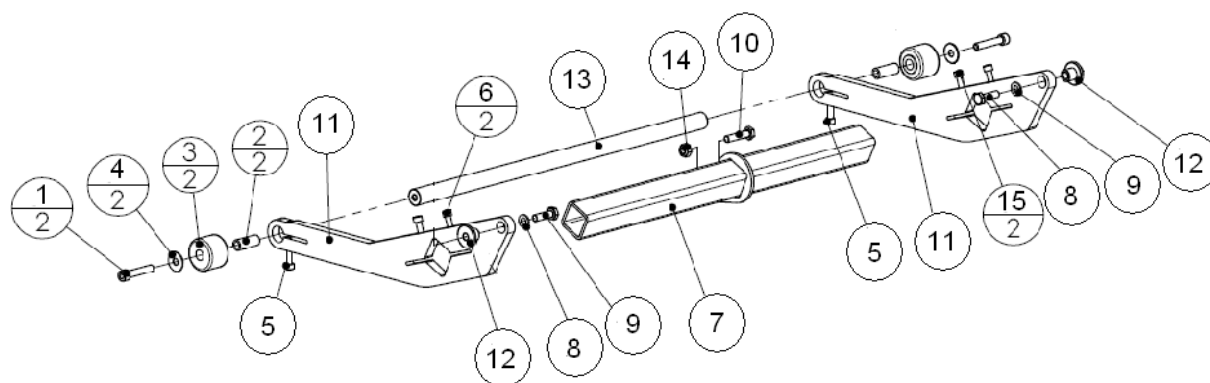
2.8 Motor compartment 9394502

Item no.	Quantity per assy	Part Number	Description
1	1	212149	CABLE TIE
2	2	212150	CABLE TIE
3	3	212150	CABLE TIE
4	1	217201	POWER ENTRY MODULE
5	1	220017	LINAK LA 31 ACTUATOR 250 MM
6	1	241001	RJ45 CABLE 1 METER
7	1	250002	SERVO AMPLIFIER 2,2 kW 230 V
8	1	928931	LABEL, EARTH POTENTIAL
9	1	928959	LABEL, PROTECTIVE EARTH
10	1	932712	EARTH CABLE , CRIMP TERMINALS M5
11	1	932712	EARTH CABLE , CRIMP TERMINALS M5
12	2	939027	ISOLATED FIXATION BLOCK
13	1	939028	TENSIONER
14	1	9390403	CHASSIS MOTOR COMPARTMENT
15	1	939062	COVER PLATE, (TCM)
16	1	939070	LABEL REMOTE CONTROL
17	1	939071	LABEL SAFETY SYMBOLS
18	1	9394403	MOTOR ASSY
19	1	939705	EARTHCABLE POWER ENTRY MODULE
20	1	939705	EARTHCABLE POWER ENTRY MODULE
21	1	939708	MOTOR FAN ASSY
22	1	939714	POWER CABLE SERVO AMPLIFIER
23	1	945003	BLIND PLATE
24	1	9457013	TCM ASSY
25	1	945741	CABLE ASSY DISPLAY FB
26	1	981964	EARTH POTENTIAL SOCKET
27	2	811706	HEXAGONAL SET SCREW M6
28	2	811707	HEXAGONAL SET SCREW M8
29	6	811724	EXTERNAL TOOTHED WASHER M4
30	2	811744	FLAT WASHER M4
31	1	811745	FLAT WASHER M5
32	1	811746	FLAT WASHER M6
33	4	811764	SPRING WASHER M4
34	1	811765	SPRING WASHER M5
35	1	811766	SPRING WASHER M6
36	2	811768	SPRING WASHER M10
37	1	811861	FULL NUT WITH NYLON INSERT M10
38	1	811862	FULL NUT WITH NYLON INSERT M8

2.8 Motor compartment 9394502

Item no.	Quantity per assy	Part Number	Description
39	2	811874	CONTACT LOCKING RING M5
40	2	811875	CONTACT LOCKING RING M6
41	4	813006	CYLINDRICAL SCREW M3 X 8
42	7	814007	CYLINDRICAL SCREW M4 X 10
43	2	814011	PAN HEAD SCREW CROSS M4 X 16
44	4	814017	PAN HEAD SCREW CROSS M4 X 45
45	7	814813	HEXAGONAL THREADED SPACER M4 X 25
46	2	814822	HEXAGONAL THREADED SPACER M4 X 70
47	1	815008	PAN HEAD SCREW CROSS M5 X 12
48	1	818517	PAN HEAD SCREW CROSS M4 X 45
49	2	818613	HEXAGONAL SET SCREW M10 X 25
50	1	827741	SPHERICAL RING M8
51	5	871820	FLAT WASHER NYLON M4
52	1	873058	CLEVIS JOINT WITH SPRING LOADED PIN

2.9 Grade adjustment assy



Item no.	Quantity per assy	Part Number	Description
1	2	818419	ALLEN SCREW M10 X 55
2	2	932153	SPACER FOR WHEEL
3	2	932159	WHEEL
4	2	811788	FLAT WASHER M10 X 30
5	2	817415	ALLEN SCREW M8 X 35
6	2	817419	ALLEN SCREW M8 X 55
7	1	9390252	TORSION PIPE, SQUARE
8	2	811748	FLAT WASHER M10
9	2	818615	HEXAGONAL SET SCREW M10 X 35
10	1	818517	HEXAGONAL SET SCREW M10 X 45
11	2	939140	FEET GRADE POSITION
12	2	939142	HINGE AXLE
13	1	939154	HORIZONTAL AXLE
14	1	811861	FULL NUT WITH NYLON INSERT M10
15	2	817419	ALLEN SCREW M8 X 55

3 Procedures

3.1 Fixation and removal of the handlebar

Required tools:

- Allen key #5 & #6

Instruction

1. Put the connectors together and slide them into the side rail. (figure 1, A)
2. Put this post into the side rail. Make sure the cable is not jammed or damaged. (figure 1,B)
3. Fix the standard in the side rail with a 6 mm Allen Key. Push the bolt of the standard with help of the Allen Key through the hole through the side of the side rail and turn to the right. Just fix the bolts in order to allow some movement of the posts.(figure 1, C)
4. Place the other posts in their position in the side rails and fix them the same way as mentioned at the previous stage.(figure 1, D)
5. Put the connectors together and slide them into the handrail Upper frame.(figure 1,E ;figure 2)
6. Be sure that the cable is moved to the front, towards the lanyard magnetic switchbox. Jamming or damaging of the cable must be avoided! (figure 1,H)
7. Lower the Handrail Upper frame over the 4 standards (figure 1;F)
8. Two pair of hands is needed. Make sure the handrail upper frame firs exactly on the clamps at all 4 posts (figure1, F)
9. Fix the bolts of the posts with Allen key #6 (figure 1, D)
10. Tighten the clamps by using Allen key #5 (figure 1,F)

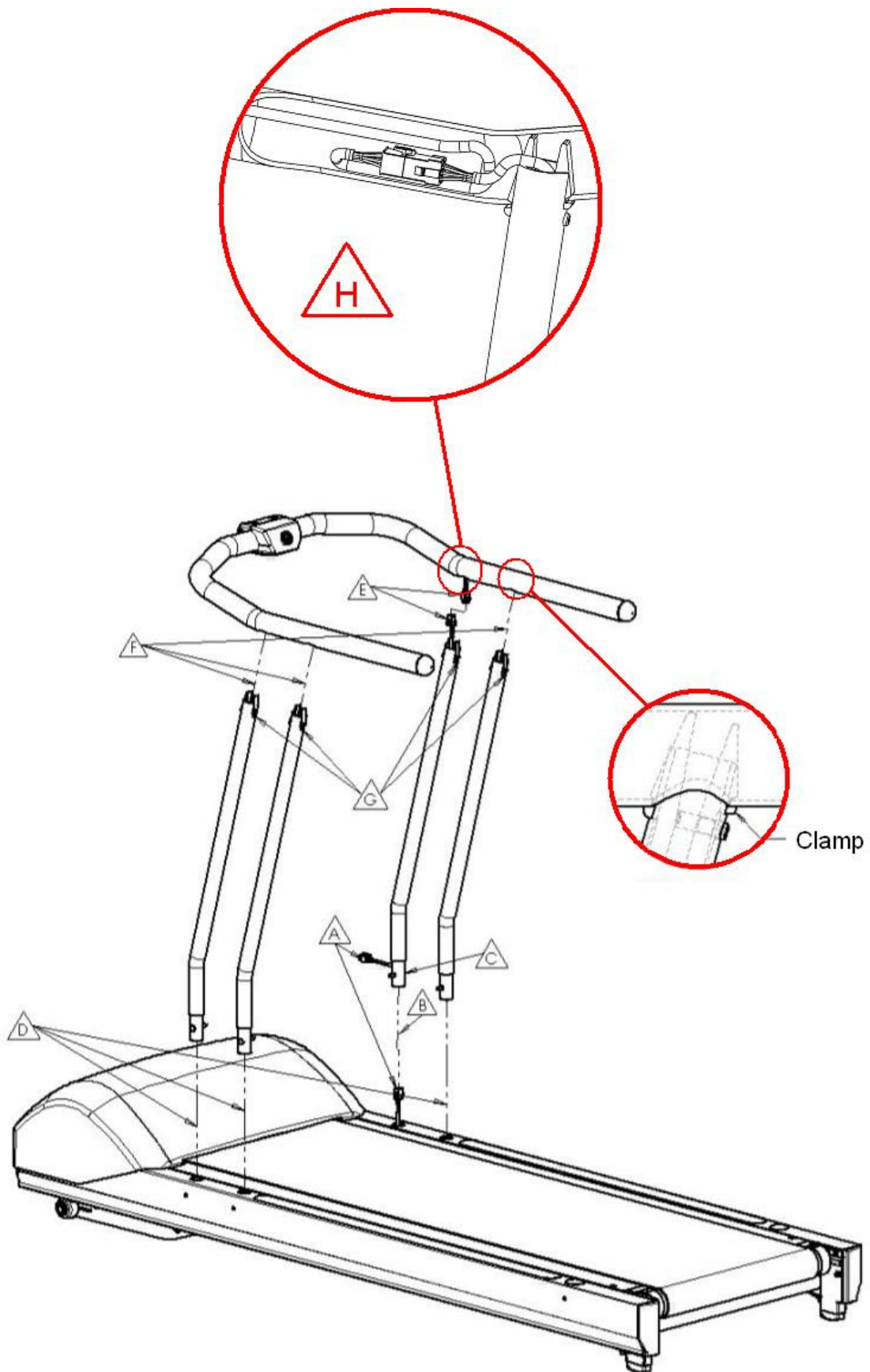


figure 1

3.2 Removal of the cover motor compartment

Required tools:

- Allen key #3

Instruction

1. Use the Allen key #3 to remove the screws in the housing of the motor compartment of the treadmill (figure 1&2)
2. Lift the housing from the back side and gently pull it up (figure 3& 4)

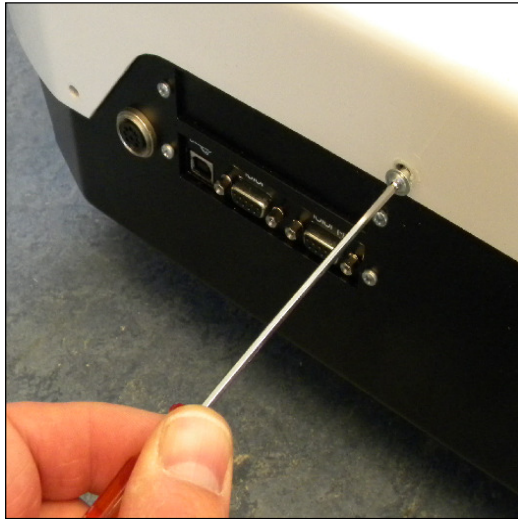


fig.1

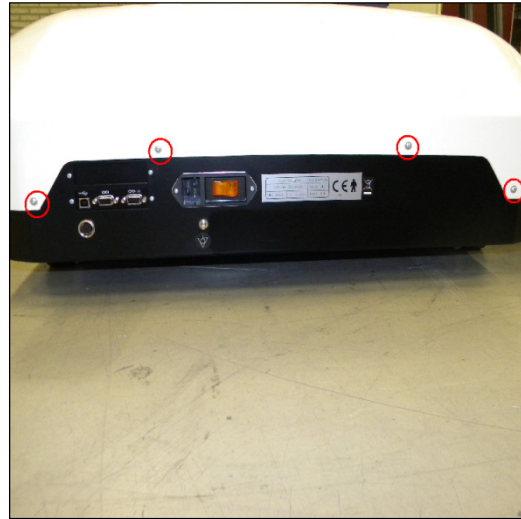


fig. 2



fig.3



fig.4

3.3 Replacement Communication interface module (CIM)

Required tools:

- Philips screw driver # 1

Instruction

1. Remove the cover of the motor compartment as described in the instruction “removal cover of the motor compartment.
2. Remove the flat cable from the main board (figure 1)
3. Remove the flat cable from the communication interface module (figure 2)
4. Remove the two screws out of the CIM (figure 3)
5. Hold the board when removing the second screw and take the CIM out.

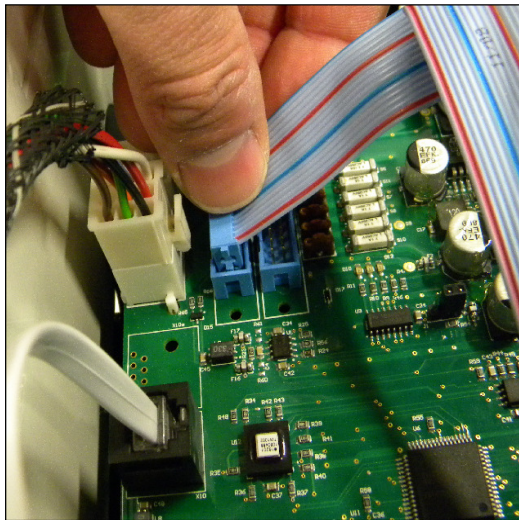


fig.1

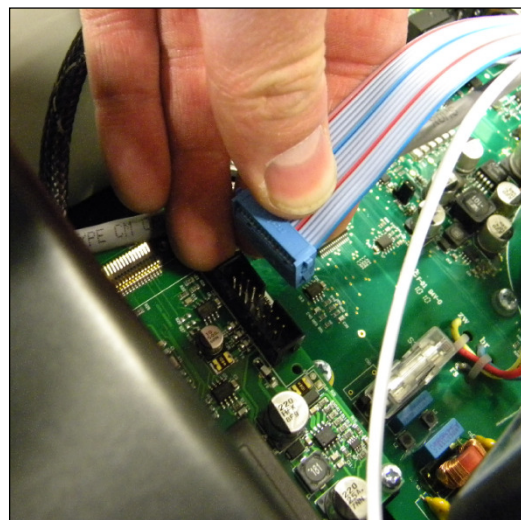


fig.2



fig.3



fig.4

3.4 Replacement instruction grade motor 220017

Required tools:

- Wrench 17 mm (2X)

Instruction

1. Remove the cover of the motor compartment as described in the instruction “removal cover of the motor compartment.
2. Put the treadmill on its side (figure1)
3. Remove the M10 bolt, at the underside of the treadmill, by using two 17 mm wrenches (figure 2&3)
4. Remove the M10 bolt, from the grade motor, in the motor compartment of the treadmill. (figure 4)
5. Cut the tire wrap that holds the cable of the grade motor (figure 5)
6. Unplug the cable from the mainboard (figure 6)
7. Slide the grade motor backwards (figure7).
8. Pull the motor out of the housing (figure 8)
9. Reassemble the treadmill in the opposite direction
10. Make sure you reconnect the grade motor to the mainboard(figure 6)

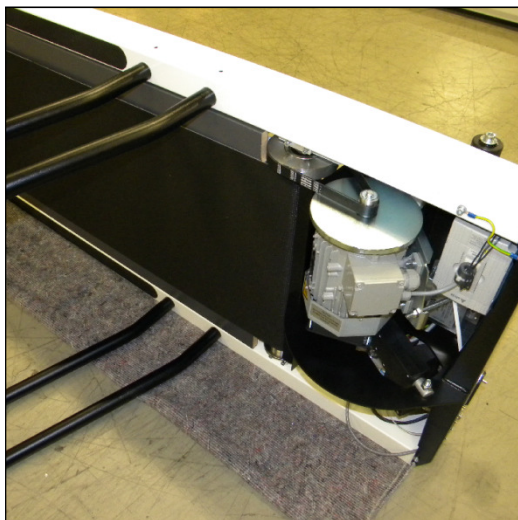


fig.1



fig.2



fig.3



fig.4

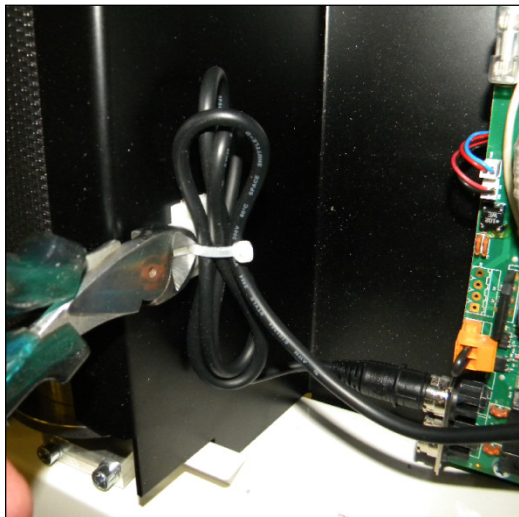


fig.5

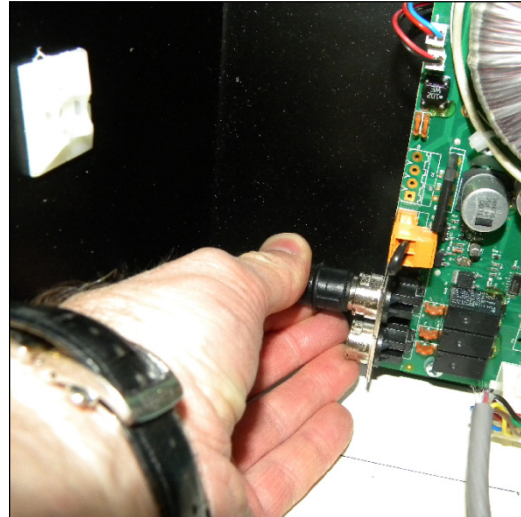


fig.6

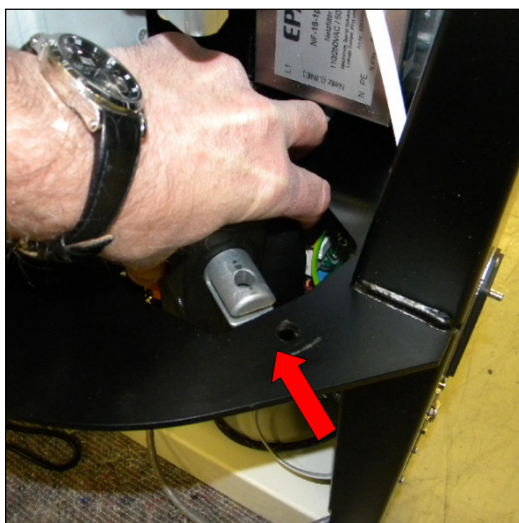


fig.7

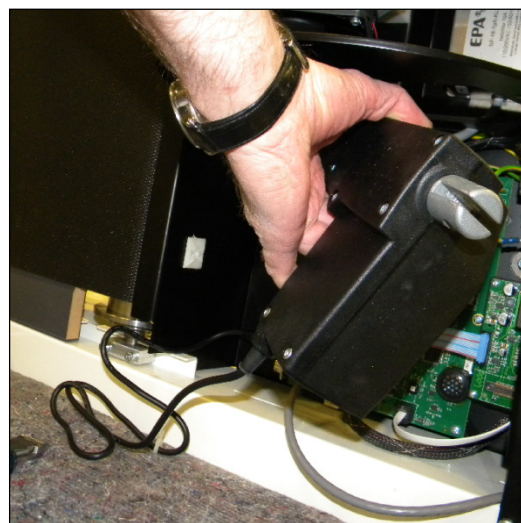


fig.8

3.5 Replacement instruction main board 945701

Required tools:

- Philips screw driver #2

Instruction

1. Remove the cover of the motor compartment as described in the instruction “removal cover of the motor compartment.
2. Remove the grade motor as described in the replacement instructions of the grade motor.
3. Remove the cables from the main board (figure 1,2,3,4,5,6,7&8)
4. To remove the cables from the power entree/circuit breaker it is easier to take the two screws out.
5. Flip the two Faston connectors of by unlocking them with e.g. a small screwdriver (fig.11)
6. Remove the screws that hold the mainboard and take out the mainboard.

Note: Make sure you use the shakeproof washers at the indicated locations when you place a new mainboard into the treadmill.

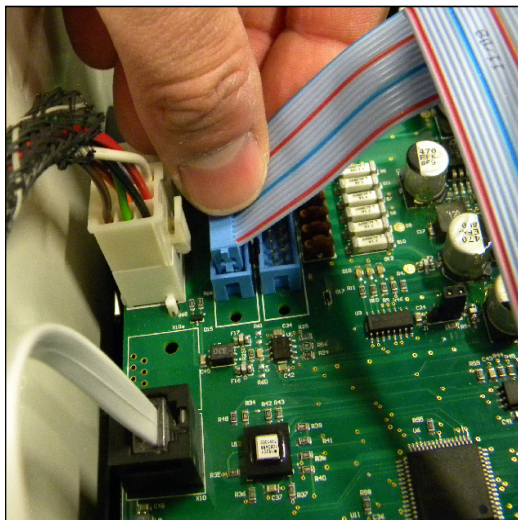


fig.1

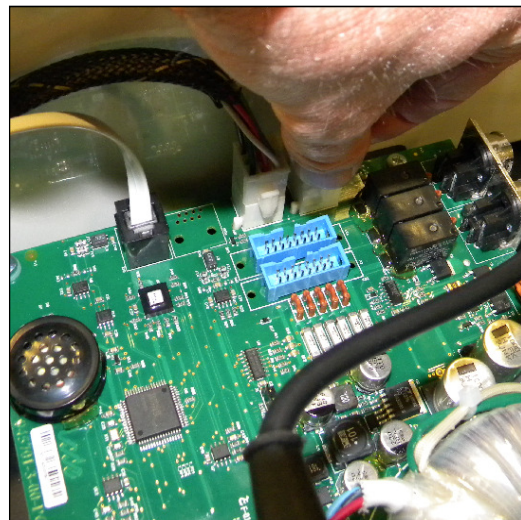


fig.2

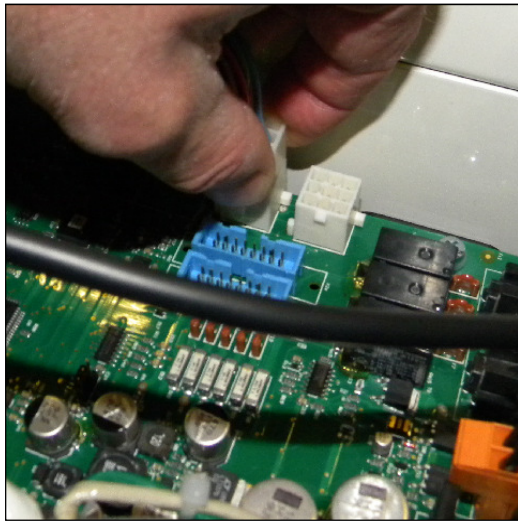


fig.3

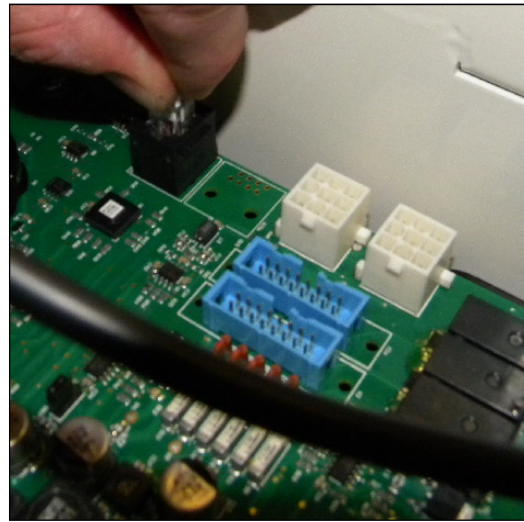


fig.4

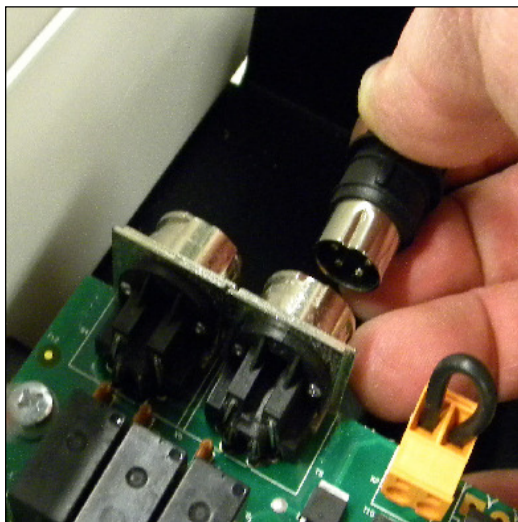


fig.5

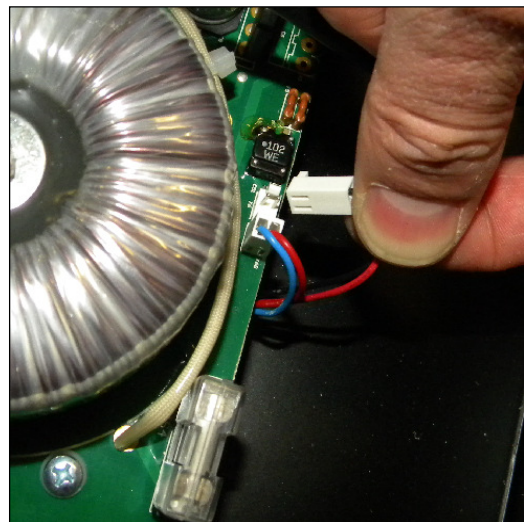


fig.6

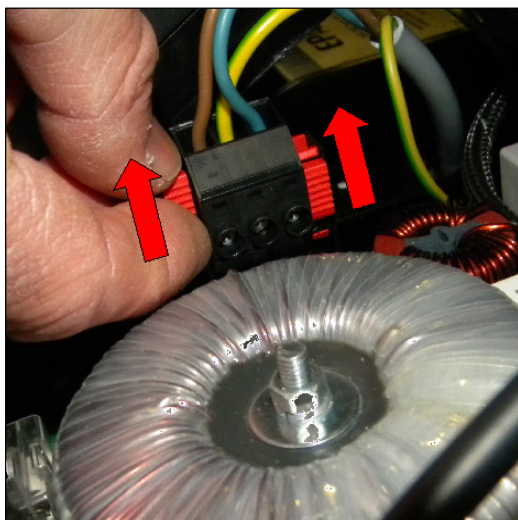


fig.7

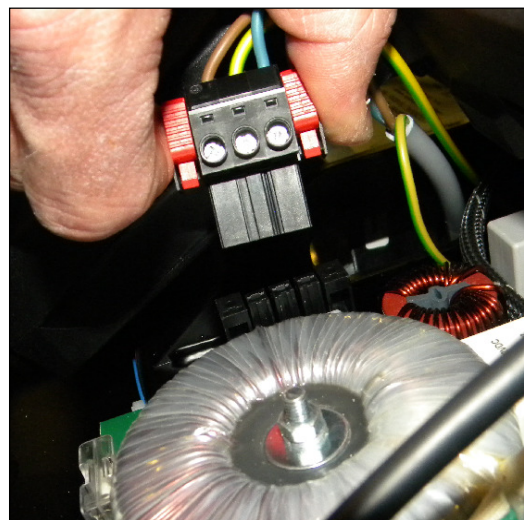


fig.8

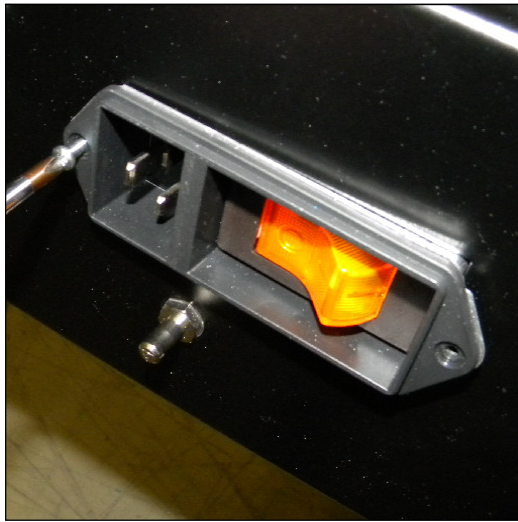


fig.9

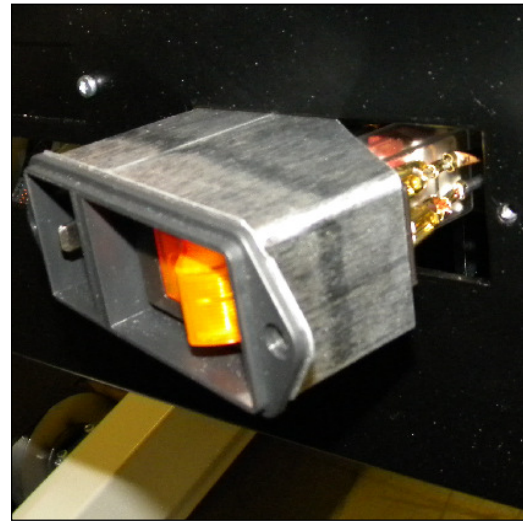


fig.10

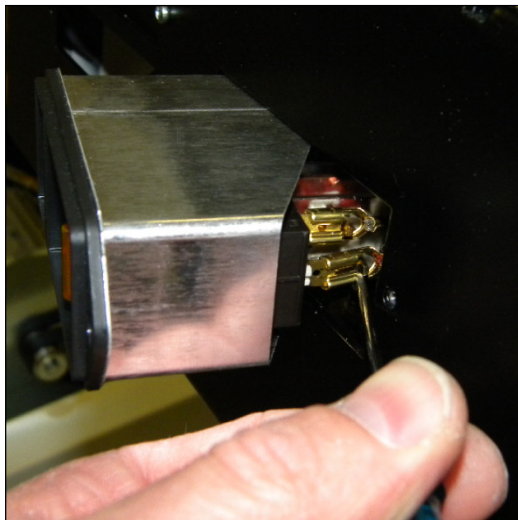


fig.11

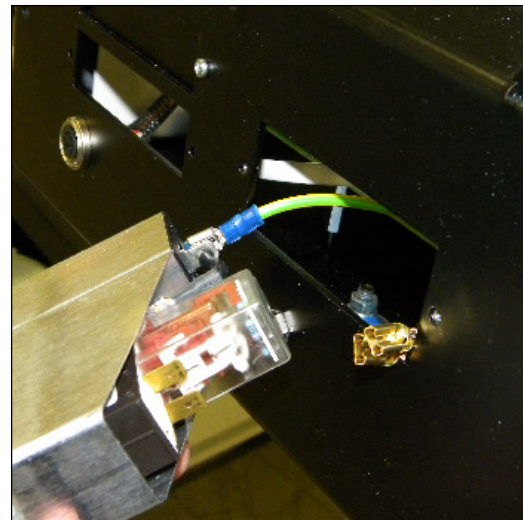


fig.12

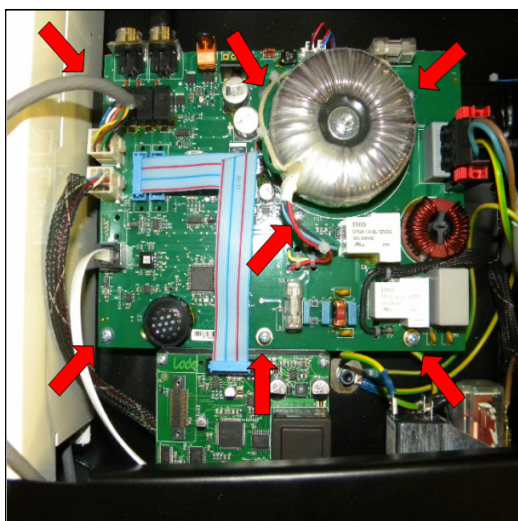


fig.13

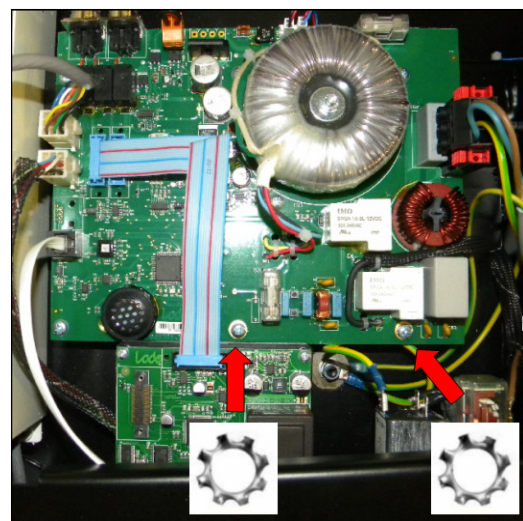


fig.14

3.6 Replacement instruction belt & deck

Required tools

- Allen key #3,#4,#5,#6
- Slotted screw driver #2
- Philips screw driver #2
- Ring spanner #10

Instruction

1. Remove the cover of the motor compartment as described in the instruction “removal cover of the motor compartment.
2. Remove the cosmetic covers at the (figure 2)
3. Remove the pin plug out of the left and right side of the white housing (figure 3)
4. Now remove the white housing, be careful with the earth potential plug (figure 4)
5. In case side rails are mounted on the Valiant it is wise to remove them first you can use Allen key #4 for this (figure 5)
6. Remove the Allen screws #6, on left and right side of the roller, that hold the back roller of the treadmill (figure 6 & 7)
7. Use a Philips screwdriver #2 to remove the two Philips screws in the cosmetic strip (figure 8)
8. Slide out the strip (figure 9)
9. Slide out the roller (figure 10)
10. Remove the cosmetic covers of the Philips screws that hold the deck in place (figure 11)
11. Now untighten and remove the Philips screws by using Philips screw driver #2 and ring spanner #10 (see figure 12)
12. Go to the output shaft, which is the front roller of the treadmill. Use Allen key #5 to remove the two screws left and right that holds the black safety bracket of the this roller (figure 13)
13. Now untighten the two Allen screws #5 for only one turn counter clock wise. These are located at the bottom side of the treadmill (figure 14)
14. Now you are able to remove the safety bracket (figure 15)
15. You can access the two aluminium fixation blocks that hold the front roller in position (figure 16)
16. Remove the belt from the motor to the front roller. (see figure 17 & 18)
17. Slide out the front roller (figure 19 & 20)
18. You are able to lift the deck and remove the belt (figure 21)
19. After you have removed the belt remove the deck as well (figure 22 & 23)
20. Only the chassis of the treadmill will be left (figure 24)
21. Place the new belt and deck in position and reassemble the treadmill in the opposite direction as described above.

Important steps are the fixation of the safety bracket of the front roller. The two Allen screws at the bottom side of the treadmill can easily be forgotten (see figure 14).

Make sure you align the belt and adjust the tension of the belt according the specifications in this service manual.



fig.1

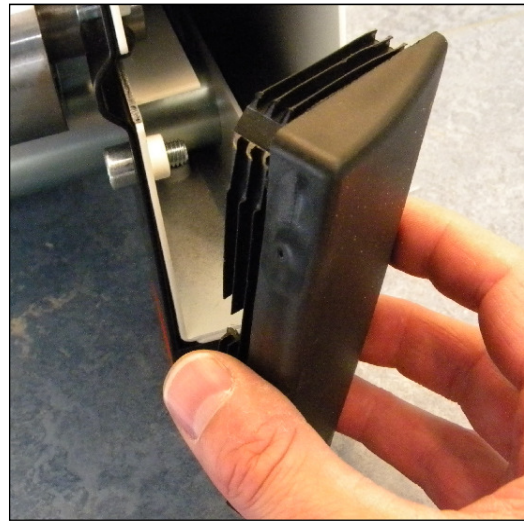


fig.2



fig. 3

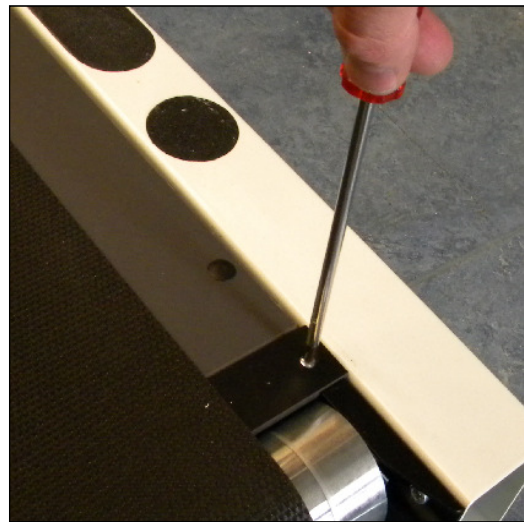


fig.4

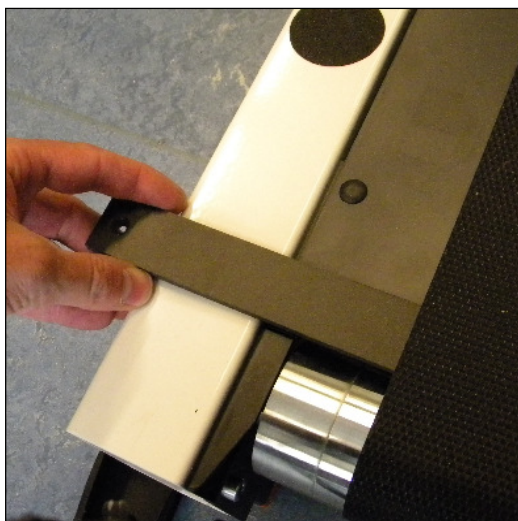


fig.5

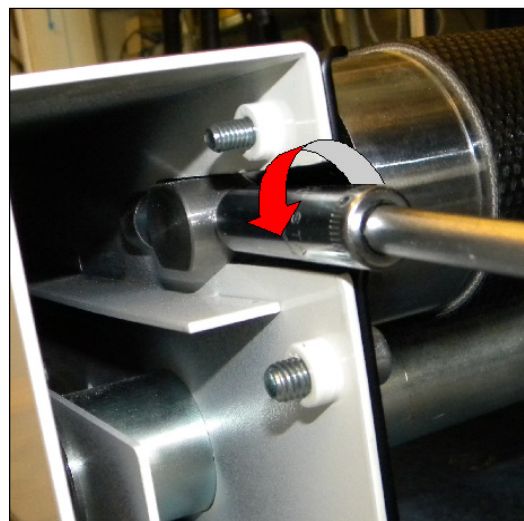


fig.6

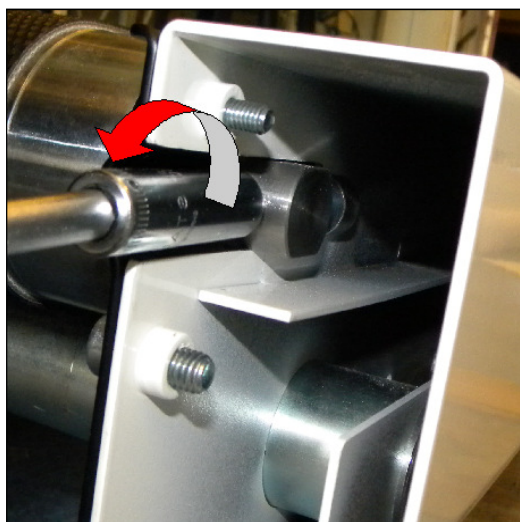


fig.7

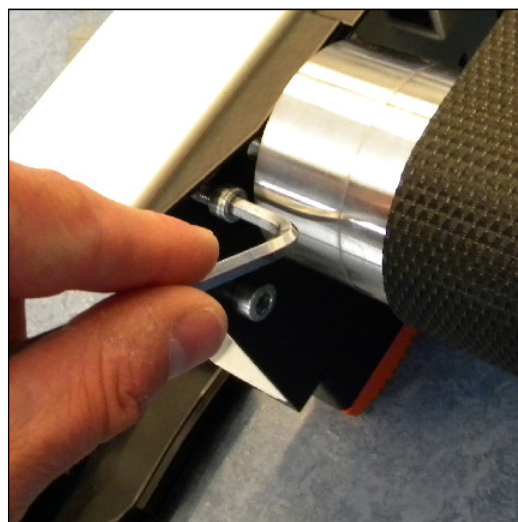


fig.8



fig.9

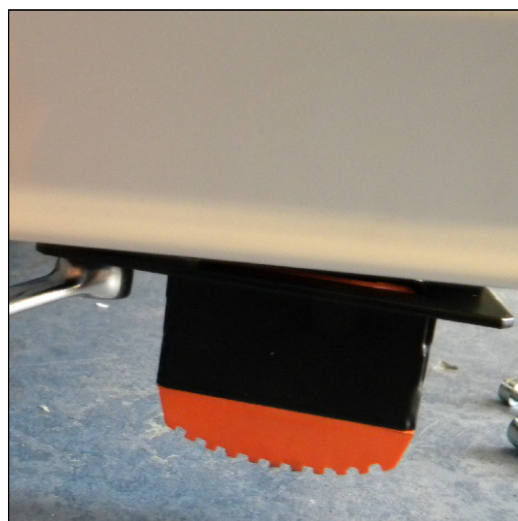


fig.10



fig.11

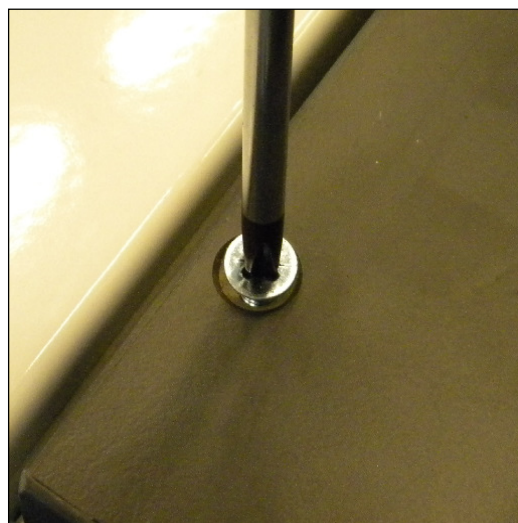


fig.12

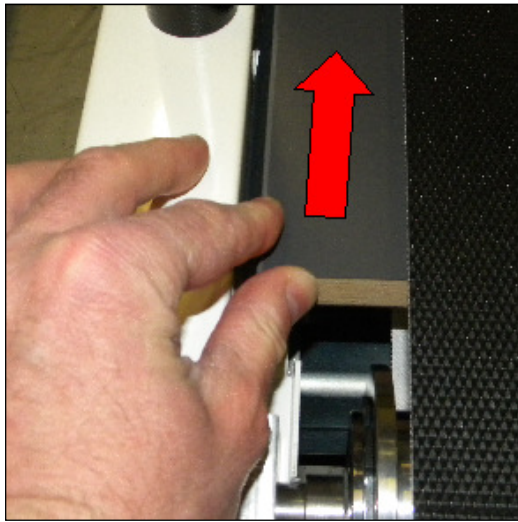


fig.13

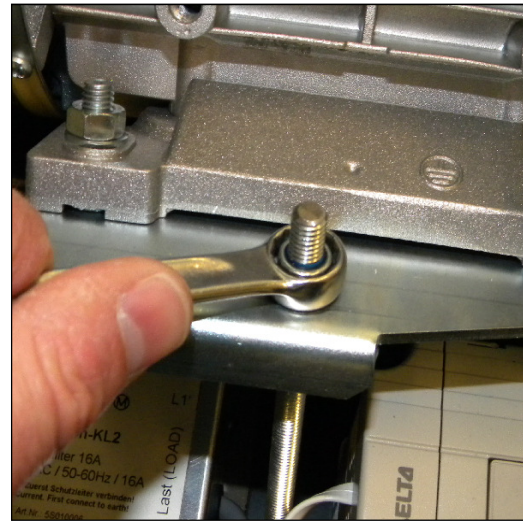


fig.14

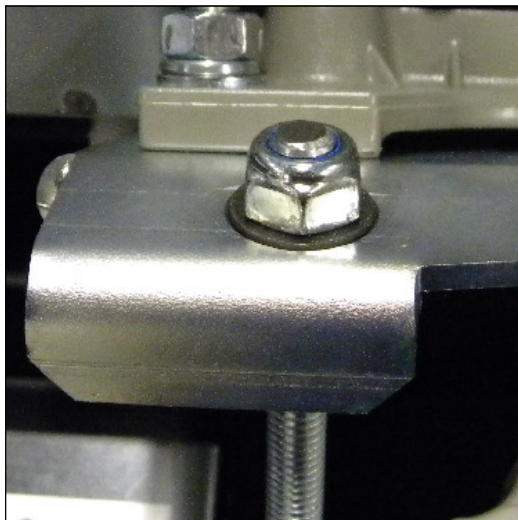


fig.15

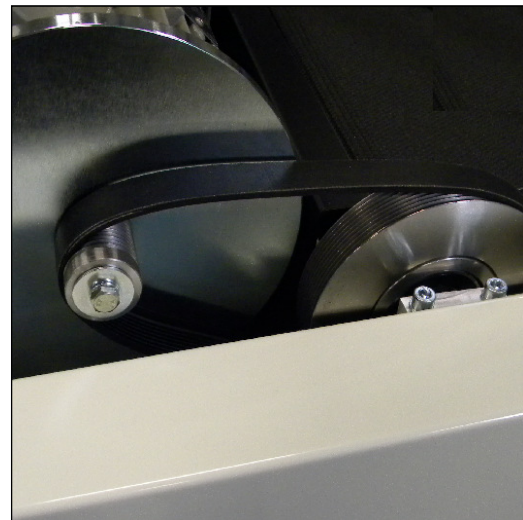


fig.16



fig.17



fig.18

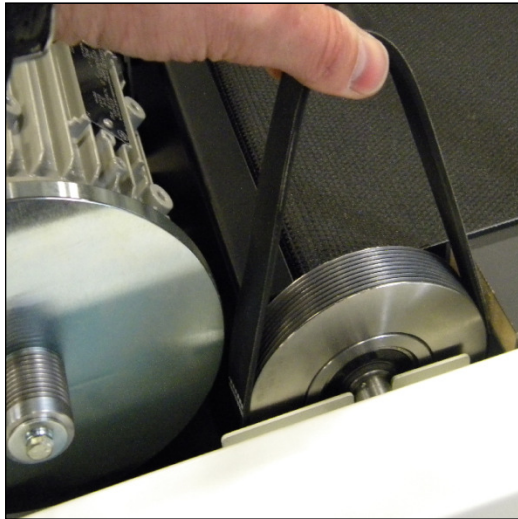


fig.19

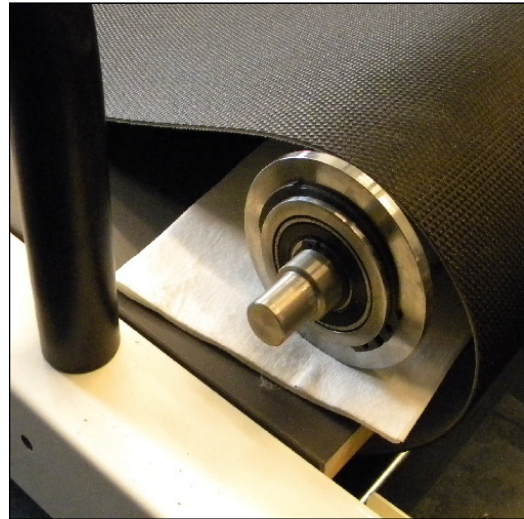


fig.20

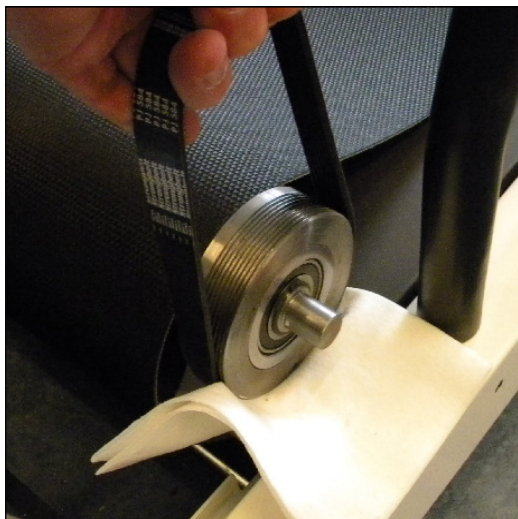


fig.21



fig.22



fig.23

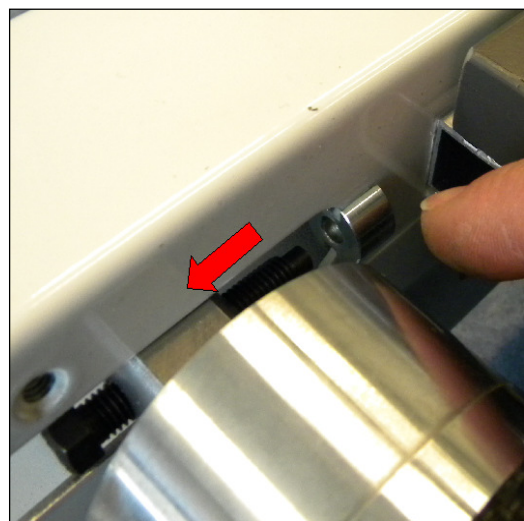


fig.24

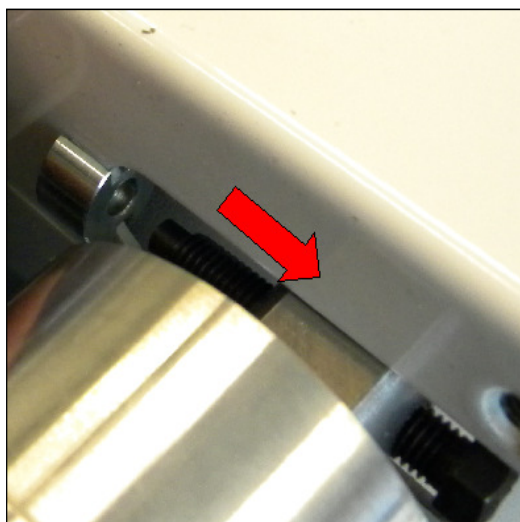


fig.25

3.7 USB driver installation

When using the USB communication port on the treadmill the FTDI driver needs to be installed. This driver will install a virtual COM port on your PC which emulates a standard PC serial port such that the USB device may be communicated with as a standard RS232 device.

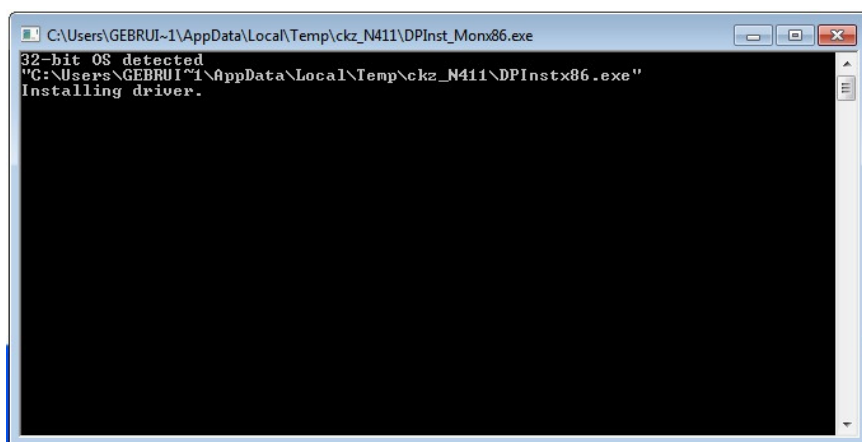
On the CD that comes with the device the driver needed is located. The drivers can also be downloaded from the website <http://www.ftdichip.com/FTDrivers.htm>

Installing the FTDI driver

The installation of the FTDI driver goes as follows. Make sure the treadmill has not been connected to the computer. Explore the CD and go to the driver directory. Execute the CDM20600.exe file (CDMXXXX.exe in which the XXXX is the driver version) the file can be recognised by the following icon:



A command window will be opened shortly



The driver has been installed. Plug in the USB cable between the computer and the treadmill and the following message will appear, in which the COM port might be different depending on the first available port.



3.8 Terminal application menu

Terminal Application

The protocol description, which follows, provides you with the information you need to connect to the Communication Interface Module (CIM) figure 1 to an external computer with suitable software and run commands from the terminal prompt.

The default RS232 communication port settings as used in the CIM are:

RS232 default communication port settings	
Name	Setting
Baudrate	57K6
Data bits	8
Stop bits	1
Parity	None

Cable specifications		
Controller		PC
9p SUB-D		9p Sub-D
2	-	2
3	-	3
5	-	5

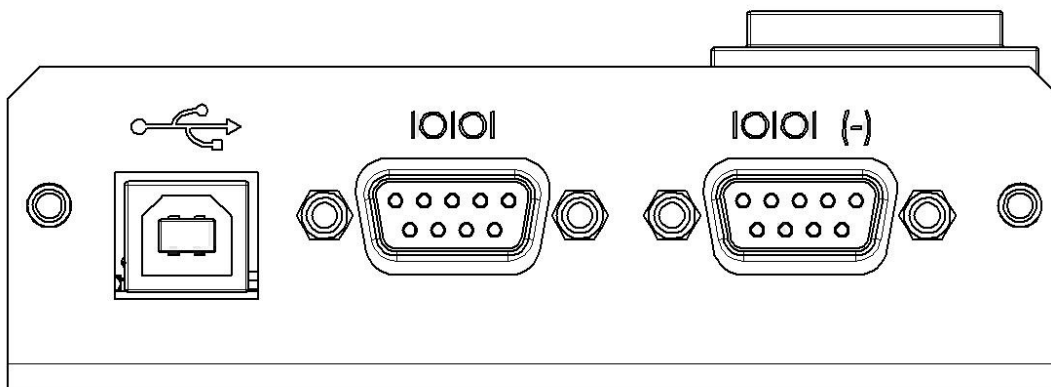


Figure 1, Communication Interface Module

To enter the Terminal Application on the CIM the following procedure must be carried out:

1. Connect the CIM to either the USB interface or the RS232 interface.
2. Start a Terminal program, (typically TeraTerm or HyperTerminal) on the PC.
3. Set the Terminal program to 56k6, no parity, 1 stopbit.
4. Switch on the mains of the apparatus and press 'Alt+b' if using TeraTerm or 'ctrl+break' if using HyperTerminal.
5. The menu of the Terminal Application is shown on the terminal program.

Changing RS232 protocol

After entering the Terminal Application on the CIM, a menu appears on-screen. For selecting the default communication protocol used with a PC, press “1”. To return to the first selections screen, press “backspace”.

There are four protocols that can be used to communicate with the Treadmill;

- Lode Treadmill
- Trackmaster
- Woodway
- Coscom (HP Cosmos)

After selecting the desired protocol, the interface to which the Treadmill is connected can be set. There are two options, USB or RS232 (10101). Do not use the 10101(-) port on the CIM. This port is for future use.

Once the interface is chosen, the baudrate for the selected protocol can be specified. If no alternate baudrate is to be used, the “default” option sets the specified baudrate for the protocol.

After setting the baudrate it is possible to change the units used in transmitting/receiving, i.e. miles/hour in, kilometres/hour out. Only the Trackmaster protocol is modified to use these settings. If no change is required, the default option (“0”) suffices.

After setting the desired parameters the CIM Terminal Application asks if the settings need to be saved. Select “Y” and power off the mains of the apparatus. After powering up the apparatus, the selected protocol is ready to be used on the selected interface.

3.9 Selecting communication protocol

To enter the terminal application of the communication interface module the following procedure must be carried out:

1. Connect a USB- or straight serial cable to connect to the communication interface module.
2. Start the HyperTerminal program (standard provided with MS Windows ® up to OS Vista)
3. Give the connection a name and press OK



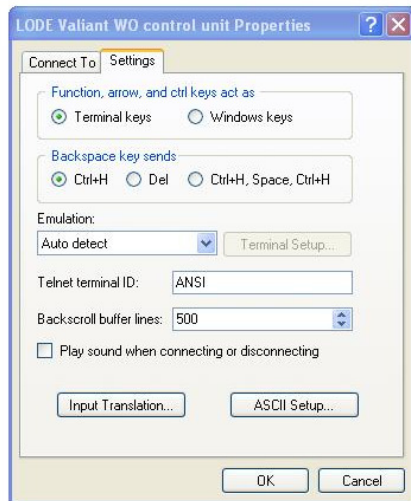
4. Select the (virtual) COM port on which the treadmill is connected



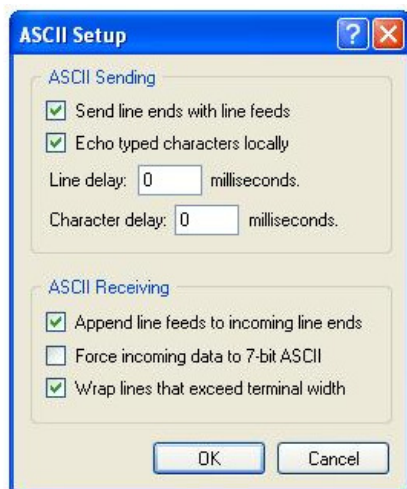
5. Select the baudrate **57600** Bits per seconds, Data bits **8**, Parity **None**, Stop bits **1** and Flow control **None**.



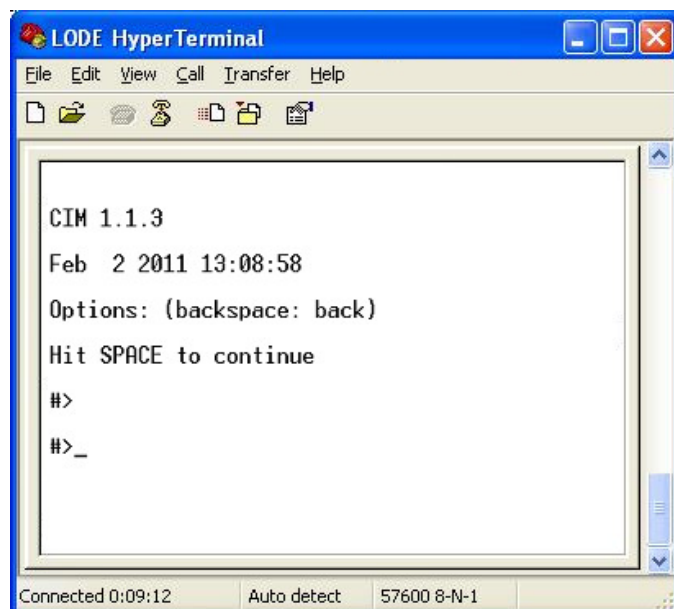
6. Go to File and select Properties in the pull down menu, select the file tab Settings.



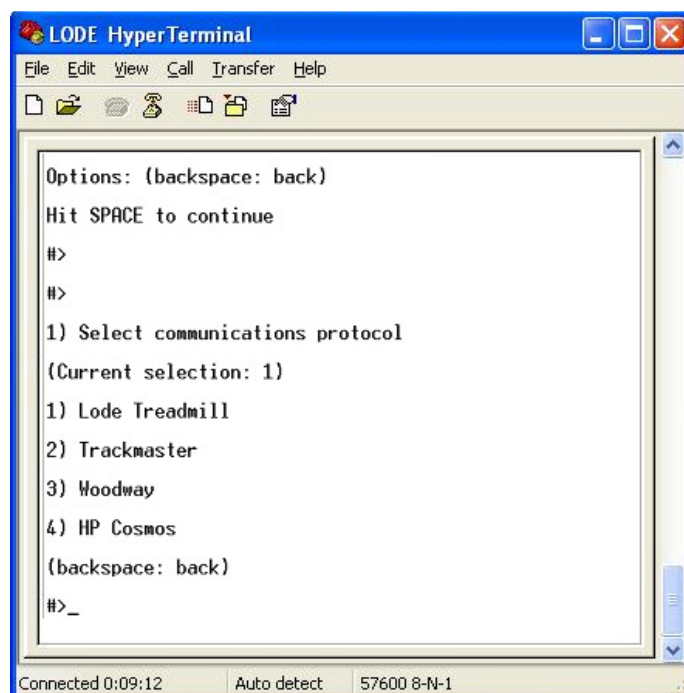
7. Choose ASCII Setup and select the tag boxes as shown below. Press OK to save changes.



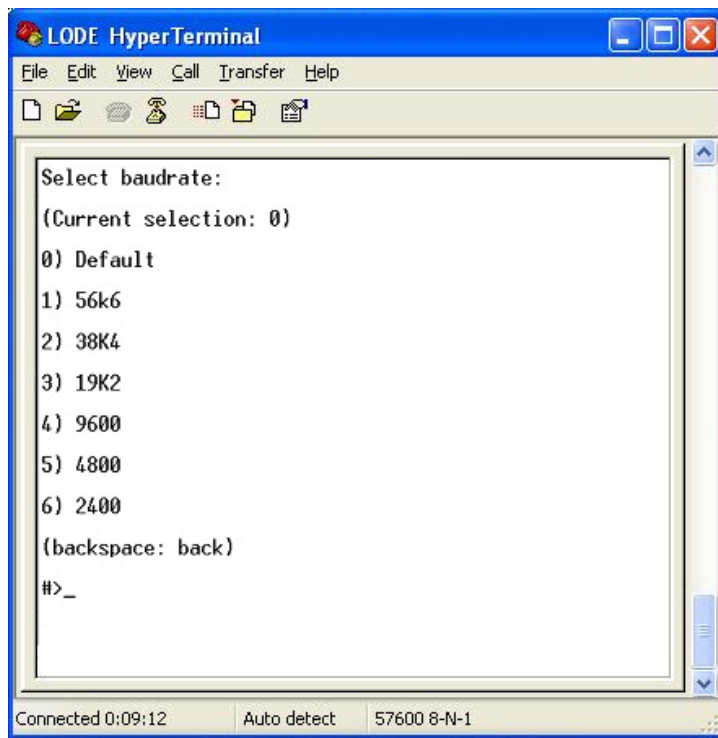
8. Switch on the treadmill and immediately press Ctrl + Break on the key board of the computer.



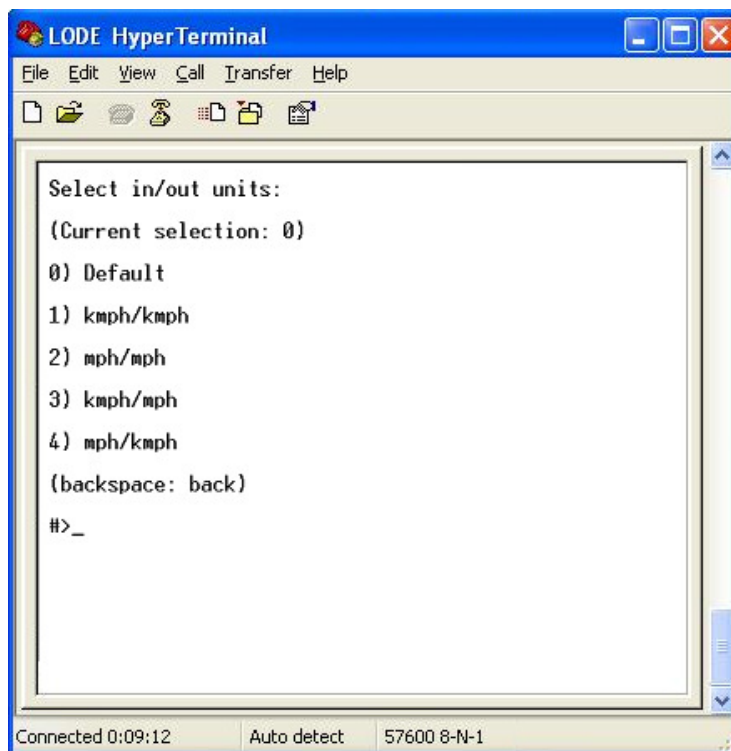
9. The information on shown in Hyperterminal should be as above



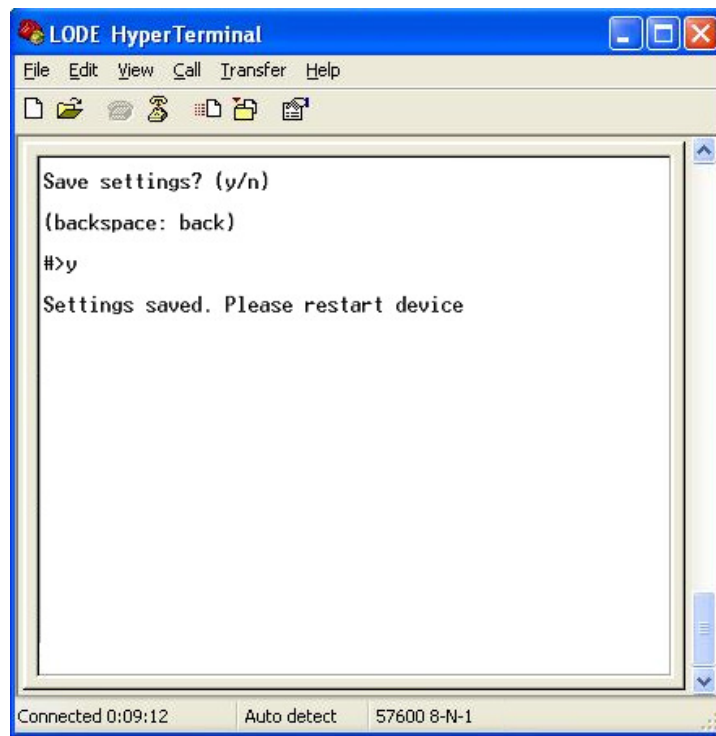
10. When SPACE is pressed the menu to select the communication protocol will appear



11. When a communication protocol has been selected you can choose the baud rate



12. After the baud rate has been selected the correct units can be chosen

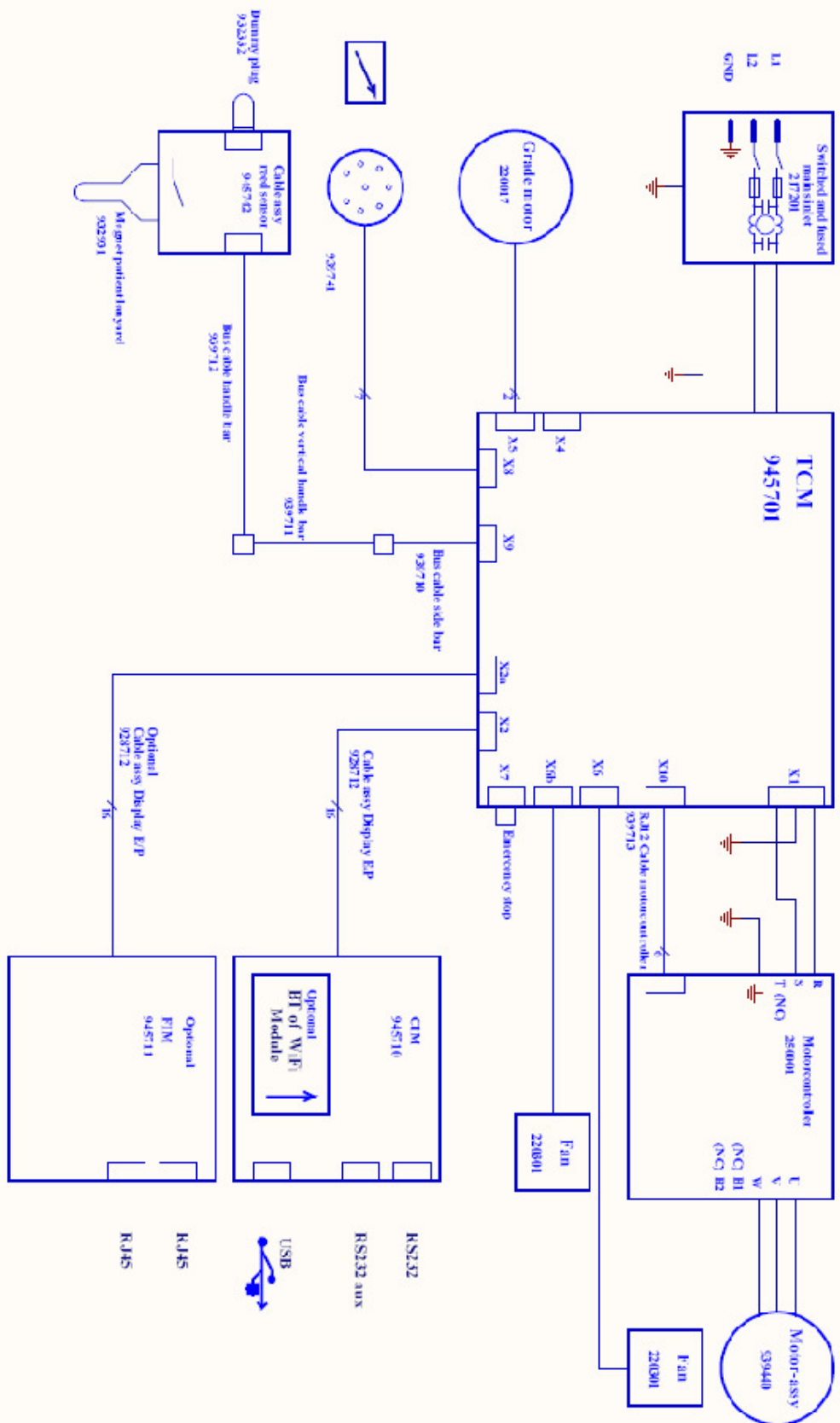


13. After that you will be asked to save the settings

14. Save or discard the changes and restart the treadmill for the changes to take effect

4 Schematics and lay-outs





Block schematic			Date : 19.10.2010
	Version n° : 2	Rev. n° : 1	
	Drawn : K.L.H.	Sheet 1 of 1	
	Drawn n° : 939900		

N:\R&D\Projet\Projet\Biosystems CIM Logiciel\Biosys_V1.0

5 Trouble shooting

5.1 Messages

During operation of the treadmill a full diagnostic analysis is running continuously, in case an error occurs the user needs to be warned and an audio signals will sound. LED's on the Treadmill Control Module will blink to indicated what might be the cause of the problem. The order in which they blink can be compared with table 1 in this chapter.

This chapter describes the explanation of the error codes.

When the emergency circuit is activated you will hear 5 short beeps followed by a pause of 10 seconds. This error will repeat till the cause has been taken.

For safety reasons the diagnostic of the treadmill can give an error during the self-test or during use. This error will sound 5 long beeps followed by a pause of 10 seconds. This error will make the treadmill stop. You could switch off the treadmill wait till the van has stopped turning and restart the treadmill.

If the problem still occurs you could remove the cover of the treadmill and watch for the code that has been showed by the blinking LED's D10,D11 and D12. (figure 2)

During the 5 long beeps the three LED's D10,D11 and D12 will light up for one second. This must be seen as CODE I. After that, still within the 5 long beeps there will be a pause from 1 second and then the LED's D10, D11 and D12 will light up again. This must be seen as CODE II. (figure 1)

Write down the code and compare them with the table in this document.

In case the angle measurement is malfunctioning the treadmill will warn with a beeb: long-silence-short-silence-short, after this only the speed control is available.

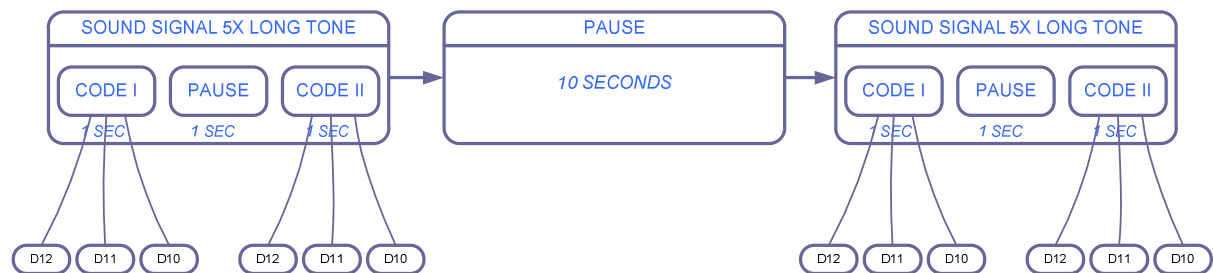
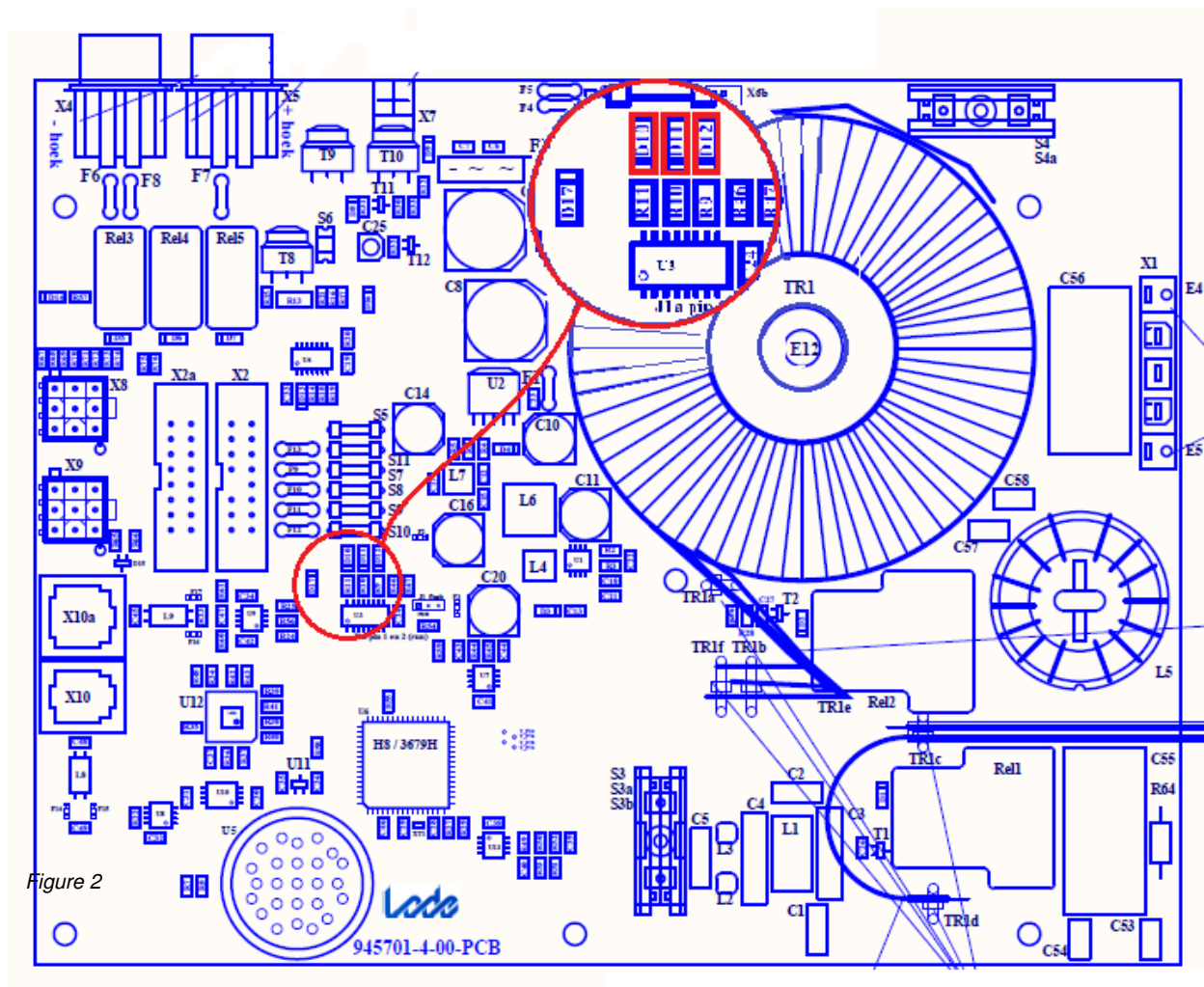


Figure 1

		CODE 1			CODE 2		
CODE	DESCRIPTION	D12	D11	D10	D12	D11	D10
TCM_ERRORS							
NO_TIMER_AVAILABLE	No software timers available Exchange TCM	0	0	1	0	0	1
ELEV_TIMEOUT	Time out on elevation, no change seen in elevation for the last 2 seconds, when expected. Check wiring to grade motor or replace grade motor.	0	0	1	0	1	0
WATCHDOG_EXPIRED	Watchdog timer expired by critical error in embedded software. Restart treadmill or replace TCM	0	0	1	0	1	1
GENERAL_STATUS_ERROR	General errors that may occur under normal conditions: <ul style="list-style-type: none">WATCHDOG ERROREXTERNE WATCHDOG ERRORRAM ERRORMODULE ERROR	0	0	1	1	0	0
RAM_ERROR	During selftest the RAM will be tested. If a problem occurs this code will be shown.	0	0	1	1	0	1
COM_GUARD_TIMER_FAILURE	Error on data exchange on internal bus. Check wiring	0	0	1	1	1	0
FREQUENTIE REGELAAR							
AC_DRIVE_ERROR	Motor controller error Check motor controller or replace motor controller	0	1	0	0	0	1
AC_DRIVE_COM_ERROR	Communication loss between motor controller and TCM. Check motor controller, service required	0	1	0	0	1	0
AC_DRIVE_CONFIG_ERROR	During selftest the motor controller has to be initialized, if fails this code will be shown. Check motor controller power. Service required	0	1	0	0	1	1
COMMUNICATIE							
NO_MODULE	During selftest the treadmill checks for communication modules, if fails this error will be shown. Check wiring replace communication module	0	1	1	0	0	1
COM_GUARD_ERROR	Time out on internal bus, restart treadmill service required when problem occurs.	0	1	1	0	1	0
GUARDING ERRORS							
SPEED_GUARD_ERROR	Difference between target speed in firmware and target speed in motor controller exceeds limits	1	0	0	0	0	1
SPEED_GUARD_ERROR2	Difference between target speed in firmware and target speed in motor controller within limits out of range too long. Check belt tension and motor controller	1	0	0	0	1	0
TEST-ERRORS							
MAN_ERROR_TRIGGER	For factory purpose only	1	1	1	0	0	1

Tabel 1



6 Maintenance

6.1 General Maintenance

Visual inspection:

- Housing
- Display
- Cables, sockets e.g. line voltage entrance
- User Interface, e.g. a keyboard

Mechanical check-up

- Technical cleaning of mechanical parts
- Freewheel assembly
- Braking assembly, bearings
- Saddle assembly/handle bar assembly

Inspection electronics

- Primary and secondary electronic circuits
- Options.

Software/Firmware

- Software/Firmware revision and/or update

Calibration

- Checking calibration dynamic

Safety test

- We advise to do a safety test after repair and maintenance according to the IEC-601-1-1, in some countries it is presubscribed by the government to do so.

Maintenance Sticker

- Place a visible sticker on the housing with recommended date for maintenance.

ATTENTION

The walking belt and deck are self-lubricating. Never use any additional lubrication!\

The check up and/or technical maintenance must be carried out conform the procedure described in this service manual. This may be done by your local dealer or another (by the manufacturer) certified body. It is also recommended that a record of the service history is kept for all activities relating to service and maintenance. In some countries this is even obliged.

Maintenance and all repairs should only be carried out by an authorized agency. The manufacturer will not be held responsible for the results of maintenance or repairs by unauthorized persons.

Opening of the equipment by unauthorized agencies is not allowed and will terminate any claim to warranty.

6.2 Speed calibration

For Calibration of the Speed from the treadmill you can use a Tachometer which can directly measure the speed at the walking belt.

A cheaper and even accurate method for calibration of the speed of the treadmill is counting the revolutions of the belt. The belt length of the standard belt is 350 cm (137,8 ")

Place a marker on the walking belt and count for two minutes how many times the marker passes a certain point at several different belt speeds.

In the table you will find how many counts pro 2 minutes you should measure.

Km/hour	Meters/sec	Miles/hour	Counts pro 2 minutes
0,5	0,14	0,31	4,8
1	0,28	0,62	9,5
2	0,56	1,24	19,0
3	0,83	1,86	28,6
4	1,11	2,49	38,1
5	1,39	3,11	47,6
6	1,67	3,73	57,1
7	1,94	4,35	66,7
8	2,22	4,97	76,2
9	2,50	5,59	85,7
10	2,78	6,21	95,2
12	3,33	7,46	114,3
14	3,89	8,70	133,3
16	4,44	9,94	152,4
18	5,00	11,18	171,4
20	5,56	12,43	190,5

Table 1

The values should be within 5%. The motor speed is absolute the motor is frequency controlled and a difference in speed could only be caused by sliding of one of the belts. E.g. the belt from drive motor to drive roller or the walking belt itself.

6.3 Grade calibration

Calibration procedure grade

Measure the inclination of the treadmill by using a angle measurement tool. The accuracy of the inclination should be within 3%

The grade of the treadmill is absolute the inclination sensor is calibrated in the factory and cannot be readjusted. In case during calibrations of the grade the grade would not within specifications this could have the following causes.

1. An offset in the grade could be caused by a floor that is not level.
2. The sensor does not respond at all because of a broken sensor

6.4 Walking belt tension

In case the belt tension needs to be readjusted, e.g. after replacement of the belt you must follow the procedure below:

1. Remove the caps (figure 3, A)
2. Make sure there is no tension on the belt, you should be able to lift the belt at least 2 cm without feeling tension.
3. Place two markers on the belt exactly 1000 mm from each other (figure 1)
4. Now start tightening the belt till the distance between the two markers is 1003 mm (figure 2)
5. To prevent from unnecessary disturbance of the run belt alignment the number of turns should be kept equal on both screws (figure 3,B)
6. To align the belt, follow the procedure in the next chapter.

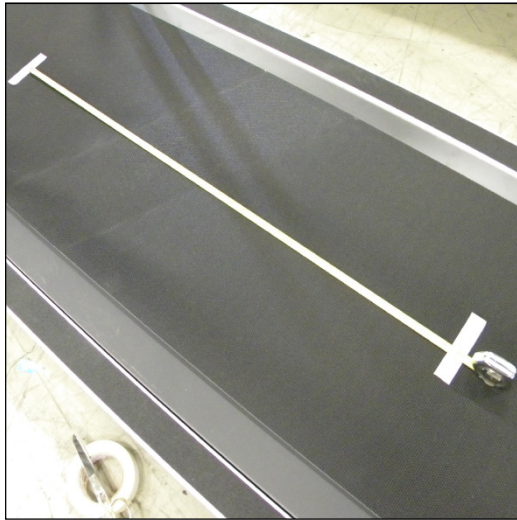


Figure 1

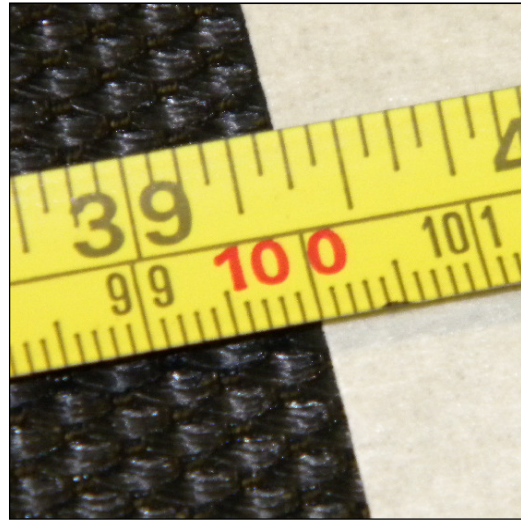


Figure 2

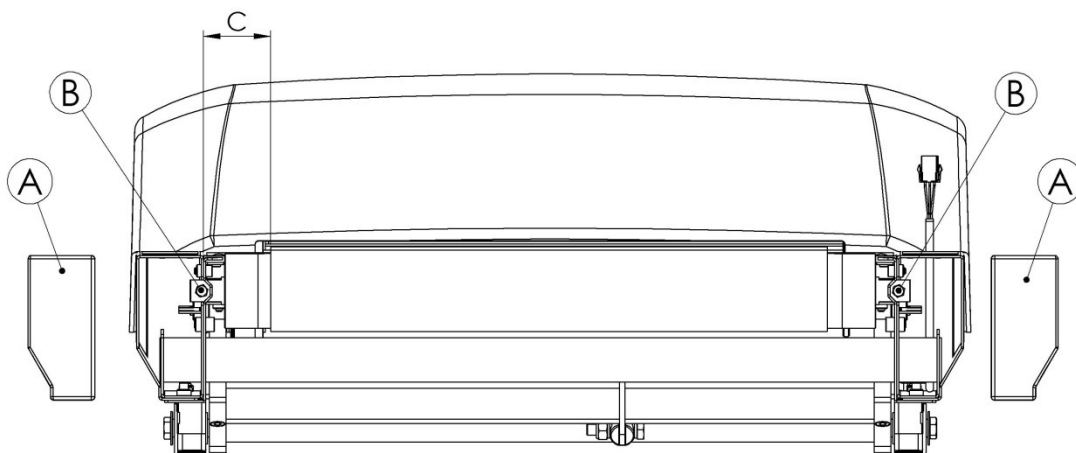


Figure 3

6.5 Walking belt alignment

When the treadmill is placed on a floor that is not flat, it is possible that the belt needs to be aligned. This may only be done by an authorized user. The following procedure must be followed:

7. Remove the caps (figure 1, A)
8. Adjust the speed of the treadmill to 5 km/h.
9. If the belt runs towards the left side, as viewed from the rear of the treadmill, adjust the left bolt, (figure 1, B), viewed from the rear end of the belt (using a size 10 socket head screw wrench) a quarter turn clockwise. The belt will now move slowly right. See Figure 5.

If the belt runs towards the right side, as viewed from the rear of the treadmill, adjust the left bolt (figure 1,B), viewed from the rear end of the belt (using a size 10 socket head screw wrench) a quarter turn anti-clockwise. The belt will now slowly move to the left. See Figure 5.

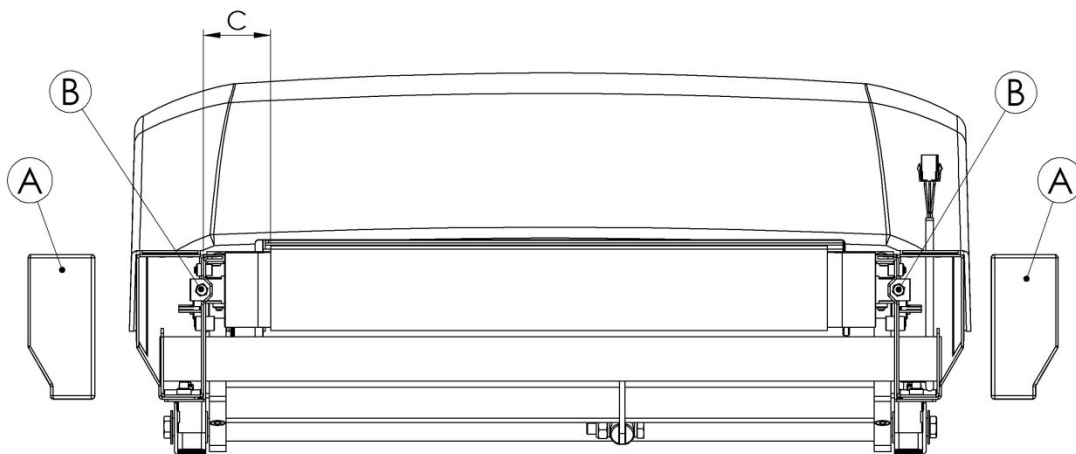


Figure. 1

See (figure 1,C). The left edge of the belt of the treadmill should run 62 ± 3 mm from the side measured at left side of the treadmill. This is indicated by (figure 1, C) in Figure 5.

ATTENTION!

The belt reacts very slowly to the turning of the tension bolt. Therefore let the treadmill run for 2 minutes. If this adjustment is not enough, repeat the action.

ATTENTION!

ONLY use the left adjustment bolts since the other bolts will influence the belt tension. This could degrade the performance of the treadmill. Do not tighten the belt too much. This will shorten the service life of the walking belt and it will make the drive motor run unnecessary heavy.

ATTENTION

Never use oil or a silicon spray as lubricant for the belt! The belt is self lubricating.

6.6 Motor belt tension

The tension of the motor belt can be checked by pulling the belt up and down in the middle between both pulleys. The full stroke must be about 10 mm.

To change the tension of the belt remove the locking nut on the spanner socket screw of the motor belt. Turning the adjustment nut on the spanner socket screw will tilt the motor upwards (increase tension), or downwards (decrease tension).

Caution: Do not over tighten the belt. This will shorten the service life of the motor belt and it will make the drive motor run unnecessary heavy.

6.7 Inclination system

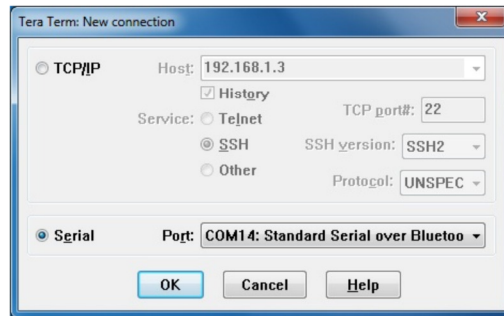
The shaft of the inclination system should be kept clean and do not have to be lubricated as the motor is closed. By opening the motor housing the warranty will decline.

6.8 Embedded software CIM and TCM

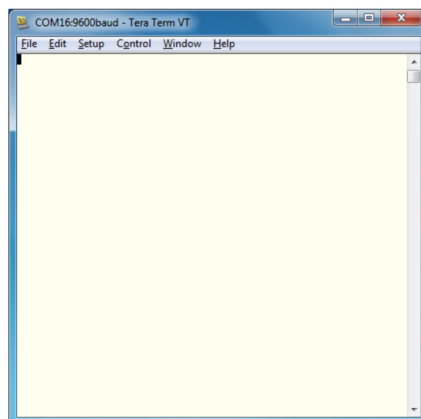
In this chapter we would like to point out how to flash new firmware into the CIM (Communication Interface Module) and the TCM (Treadmill Control Module) starting from treadmill 929900 with serial number 20110120

If you are using OS, Windows 7 you can download a terminal program such as Tera Term.

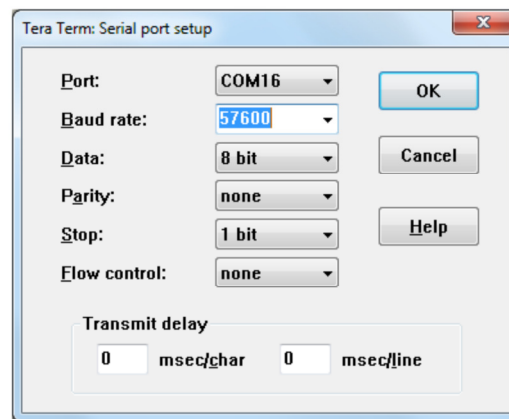
1. Start Tera Term and setup a serial connection.
2. Choose the serial port on which the treadmill is connected



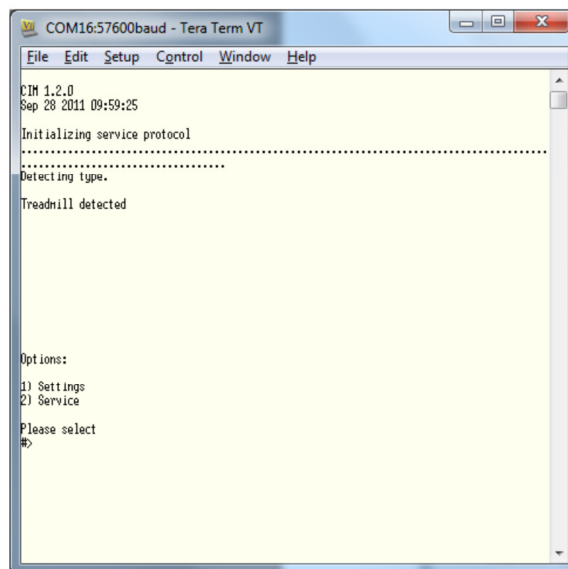
3. The following screen will appear



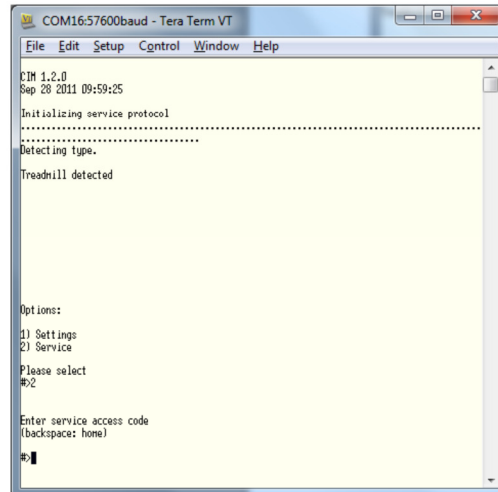
4. Choose SETUP and select SERIAL PORT
5. Set baud rate to 57600
6. Data Bit to 8
7. Parity None
8. Stopbit 1
9. Flow control None
10. Press OK when done



11. Start the treadmill and press ALT-B within 5 seconds after powering up.
12. The following screen should appear
13. Enter the service mode by selecting option "2"

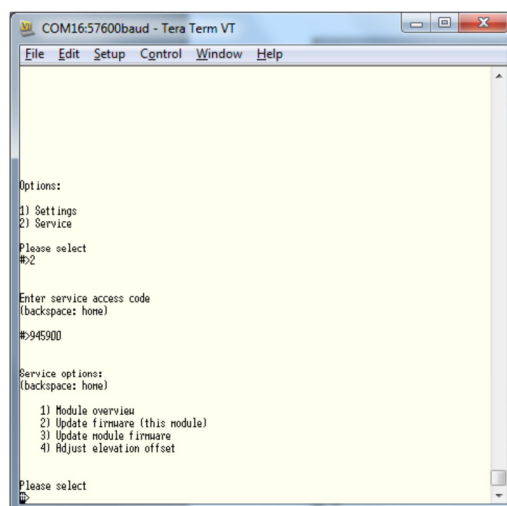


14. To access the service menu enter the code "945900"

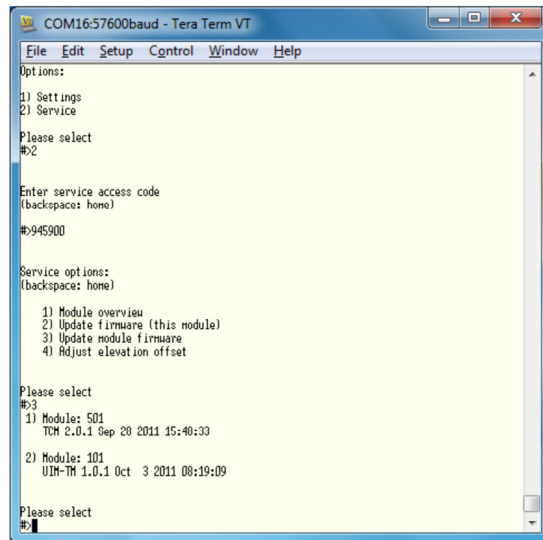


15. The following options can be selected, with the module overview the actual software can be shown.

16. Select update module software



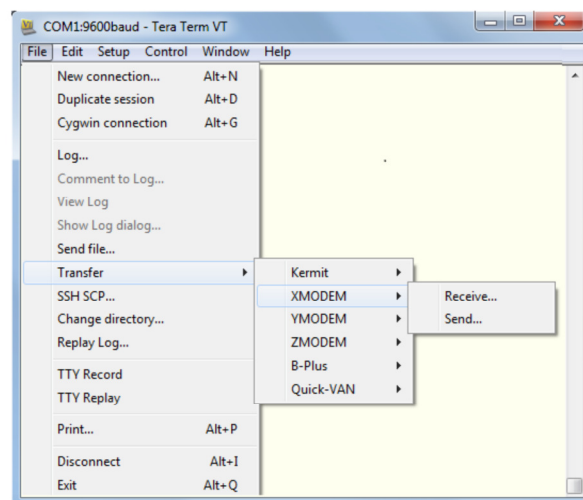
17. Select the module number that you would like to flash the software from

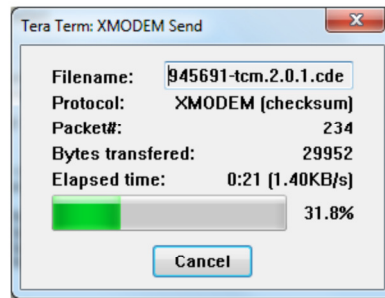


18. Select Transfer in the terminal program

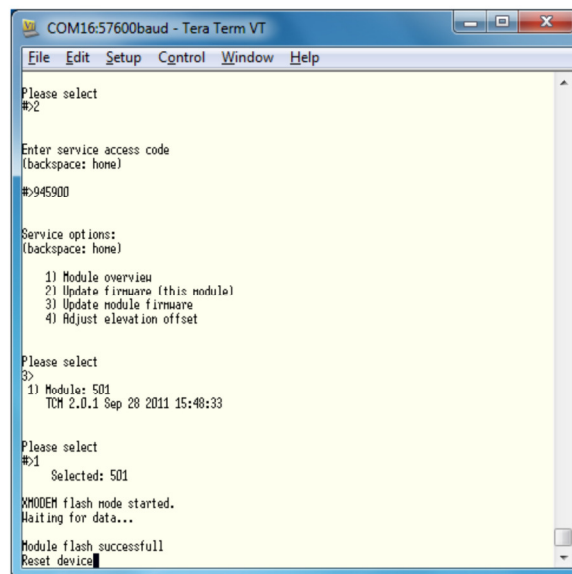
19. Choose XMODEM and Send

20. Select the XXXXX.CDE file that you would like to send





21. The complete upload will take a few minutes depending on the size of the file
22. When done, the message Module Flash successful, restart device will be shown.



As soon as a OEM treadmill has been equipped with a control unit the RS232 port and USB port will be disabled.

To activated the communication ports you have to put the control unit in terminal mode.

The following description informs you how this can be done.

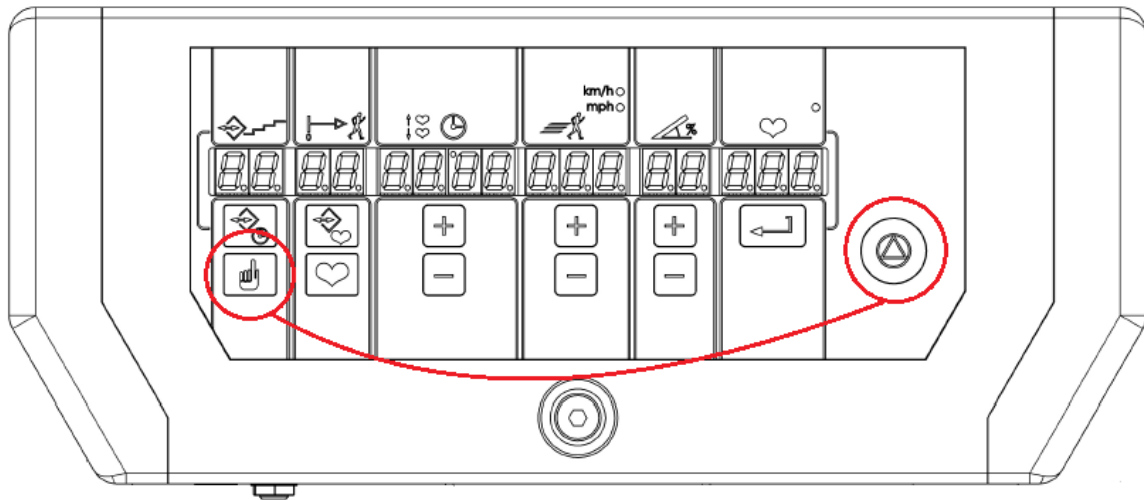


Figure 1

1. Press and hold the two keys as shown on “figure 1” for 10 seconds.
2. Press the enter key till the display shows terminal 0
3. By using the “+” and “-“ keys for the grade adjustment you can change the “0” behind terminal to “1” to activate the Terminal mode.
4. Press enter and “prot id” will be shown on the display, for Lode protocol this should be set to “1”

The following protocols can be selected

- 1 = Lode protocol
- 2 = Trackmaster communication protocol
- 3 = Woodway communication protocol
- 4 = HP Cosmos communication protocol
- 5 = GE Protocol

5. Press enter and baudrate will be displayed to set the correct baudrate, select "0" for auto select. The following baudrates can be set:

Baudrate = 0 (Autoselect dependent on protocol-id)
2400;
4800;
9600;
19200;
38400;
57600

6. Press enter and "interface" will be displayed, you can choose communication port you would like to select.

Interface = CIM interface choice
0 = RS232
1 = RS232-AUX
2 = USB

7. Press enter, the next step "Neg Elev" is read only and is "1" when a negative elevation option has been added to the treadmill, without a negative elevation option this value shows "0".

Neg Elev = Negative elevatie (read-only).
0 = not present
1 = present

Press the stop button on the control unit or wait 10 second to leave the settings menu and let your changes take effect.